RESEARCHES

PRINCIPALLY RELATIVE

TO THE

MORBID AND CURATIVE EFFECTS

OF

LOSS OF BLOOD.

BY

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TO

ROBERT HAMILTON, M. D. F. R. S. E. &c. &c.

OF EDINBURGH;

THIS LITTLE WORK IS INSCRIBED

IN TESTIMONY OF

A MOST SINCERE REGARD AND AFFECTION,

BY

THE AUTHOR.

ADVERTISEMENT.

The principal object of the present work is to apprize the inexperienced of some unexpected phenomena arising from loss of blood, of the remarkable difference in the degree of tolerance or intolerance of loss of blood in different diseases, of the equal danger of an inefficient and undue use of the lancet, and of a rule which may be adopted to obviate this danger.

Another object has been to establish, beyond the reach of controversy, a distinction between two classes of morbid affections, that of inflammations, and that irritations.

Each of these points will be found to be of the utmost moment in the daily practice of physic.

I first published some observations on the subjects of the present volume, in 1820. Since that period I have been enabled to add, not only many interesting facts from my own observation, but the testimony of many respectable authors, to the facts and principles formerly detailed. Dr. Abercrombie, Dr. Kellie, and Dr. Copeland, Mr. Travers, Mr. Brodie, and Mr. Cooke, have severally added some interesting observations on the effects of loss of blood, a subject by no means understood until very recently.

As it has been my wish, in the following pages, to adduce the testimony of others relative to the morbid and curative effects of loss of blood, rather than to cite cases which have merely come under my own observation, I have eagerly inserted the facts supplied me by my friends; such facts afford not only an additional

but an unbiassed testimony to the truth of the general principles which I have laid down.

I hope hereafter to adduce a series of well-marked cases in illustration of the application of these principles in practice; and especially of the limits, exceptions, and corrections which it may be necessary to point out, in reference to the rule for bloodletting, which I have proposed.

This point might be illustrated, in some degree, by an examination of the records of medicine. The general result of such an examination will be found to accord with the principles which I have laid down. But few particular instances could be adduced, on account of the almost universal neglect of attention to the position of the patient, in which bloodletting has been instituted.

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PART FIRST.

ON THE MORBID EFFECTS OF LOSS OF BLOOD.

CHAPTER I.

INTRODUCTORY OBSERVATIONS.

The question of the morbid effects of loss of blood appears to me not to have sufficiently engaged the attention either of the physiologist or of the practical physician; yet to both they offer objects of inquiry of great interest and importance.

To the physiologist the phenomena of syncope, of reaction, and of sinking, present innumerable objects for his consideration, of the very deepest interest. The influence of syncope on the functions of the brain, of the heart, of the capillary vessels, of the lungs, of the stomach, &c.; the phenomena of reaction, excessive or defective; but especially the phenomena and influence of the sinking state, or state of failure and decline of vital powers, in their relation both to the nervous, the circulating, and the organic

systems, severally present objects for our investigation, in a physiological point of view, at once of much novelty and of the highest utility.

To the physician the symptoms of reaction, so similar to those of some inflammatory affections of the head and of the heart, and the phenomena of the sinking state, so similar to those of some other affections of the head, and to those of some morbid affections within the chest and abdomen, present subjects for his observation of the utmost moment in actual practice. The diagnosis of these cases is most important; the prognosis and the treatment alike depend upon it.

The morbid effects of loss of blood may be divided into the immediate and into the more remote. Besides syncope, from its slightest to its fatal form, the former include delirium, convulsions, and coma. The latter comprise the states of excessive reaction, of defective reaction, of the gradual failure of the vital powers, and of a more rapid or sudden sinking or dissolution. The former, the different forms of syncope at least, are comparatively well known. The latter appear to me not to have received the degree of attention due to them. No author has described with accuracy the secondary or more remote effects of loss of blood under the various circumstances of repetition, or continued flow, in which it may occur. And yet when we reflect how constantly blood-letting is employed as a remedy, and how frequently hæmorrhage occurs

as a disease, it must evidently be of great moment to trace the symptoms and effects of a diminished quantity of blood upon the different functions of the human body.

This inquiry possesses a still higher interest in a practical point of view; for, as I shall immediately explain, some of the more obvious and striking effects of loss of blood, or those of reaction, are such as to suggest the idea of increased power and energy of the system, and of increased action in some of its organs, and to lead to an erroneous and dangerous employment or repetition of the lancet, when a directly opposite mode of treatment is required; while the state of actual but protracted sinking frequently resembles a state of oppression of the brain, or of congestion of the lungs, so accurately, as to prompt the unwary practitioner to a still more suddenly fatal use of the lancet.

There is another point of view in which the effects of loss of blood become interesting in the practice of physic. I have already stated that the symptoms of reaction from loss of blood, accurately resemble those of power in the system, and of morbidly increased action of the encephalon, and that from these causes the case is very apt to be mistaken, and mistreated by the further abstraction of blood. The result of this treatment is in itself again apt further to mislead us; for all the previous symptoms are promptly and completely relieved; and this relief, in its turn, again

suggests the renewed use of the lancet. In this manner the last blood-letting may prove suddenly and unexpectedly fatal.

The next point for our consideration is the influence of the age, the strength, and the varied constitution of the patient, in modifying the effects of loss of blood. On these greatly depends the tendency to defective or to excessive reaction, and to the state of sinking. So that the effects do not correspond with the measure, or even a comparative measure, of loss of blood, in different subjects. Sometimes there is no reaction. At other times the reaction is excessive and even violent. In a third instance we may be surprised by the sudden accession of a sinking state, or even of the symptoms of immediate dissolution. I think the whole of these varied and even opposite phenomena admit of a ready explanation. In general it may be said that reaction is principally observed in connexion with strength of system; in infancy and in old age reaction is slight; exhaustion from loss of blood is then most apt to show itself in the form of failure or sinking of the vital powers.

But a question still more interesting even than this, is that of the influence of different diseases in inducing in the system, resistance or susceptibility in regard to the effects of loss of blood. The discussion of this subject, and its application to practice, are reserved for the second part of this work.

The next point for our consideration in the inquiry

into the morbid effects of loss of blood, is that of the organic changes induced during the state of sinking. These are chiefly observed in the brain, in the cavities of the serous membranes, in the bronchia, in the lungs, and in the track of the alimentary canal, under the forms of effusion, œdema, and tympanitis.

We must consider, in the last place, the proper mode of treating the effects of loss of blood, both constitutional and local. This discussion will involve many very interesting questions.

The effects of loss of blood then require to be traced successively in their relation both to the central and to the ultimate parts both of the nervous and vascular systems. They involve questions of the deepest interest in regard to the physiology, pathology, and treatment.

CHAPTER II.

OF THE IMMEDIATE EFFECTS OF LOSS OF BLOOD.

1. *Of Syncope.*

The most familiar of the effects of loss of blood is syncope. The influence of the posture, and the first sensation and appearances of the patient, in this state, appear to denote that the brain is the organ the function of which is first impaired; the respiration suffers as an immediate consequence; and the action of the heart becomes enfeebled as an effect of the defect of stimulus, first from a deficient quantity of blood, and secondly from its deficient arterialization; the capillary circulation also suffers; and if the state of syncope be long continued, the stomach and bowels become variously affected.

In ordinary syncope from loss of blood, the patient first experiences a degree of vertigo, to which loss of consciousness succeeds; the respiration is affected in proportion to the degree of insensibility, being suspended until the painful sensation produced rouses the patient to draw deep and repeated sighs, and then

suspended as before; the beat of the heart and of the pulse is slow and weak; the face and general surface become pale, cool, and bedewed with perspiration; the stomach is apt to be affected with eructation or sickness. On recovery there is perhaps a momentary delirium, yawning, and a return of consciousness; irregular sighing breathing; and a gradual return of the pulse.

In cases of profuse hæmorrhagy the state of the patient varies: there is at one moment a greater or less degree of syncope, then a degree of recovery. During the syncope the countenance is extremely pallid, there is more or less insensibility, the respiratory movements of the thorax are at one period imperceptible, and then there are irregular sighs, the pulse is slow, feeble, or not to be distinguished, the extremities are apt to be cold, and the stomach is frequently affected with sickness.—There are several phenomena observed in this state particularly worthy of attention. I have remarked that when the movements of the chest have been imperceptible or nearly so, in the interval between the sighs, the respiration has still been carried on by means of the diaphragm.* It

* The respiration is carried on chiefly, if not exclusively, by the diaphragm, in some other states of the system. I have witnessed this in hysteria. The patient is then scarcely observed to breathe. Mr. Hunter observed in a dog poisoned by injecting emetic tartar into its veins, that "it continued pretty easy for about three hours, but then became a little convulsed, which increased, and at last it became senseless, with little twitchings, *hardly breathing, except with the diaphragm*, and having a low, slow pulse."—On inflammation, 8v. Edit. 1812. V. 2. p. 44.

may also be observed that the state of syncope, is often relieved, for a time, by an attack of sickness and vomiting, immediately after which the patient expresses herself as feeling better, and the countenance is somewhat improved, the breathing more natural, and the pulse stronger and more frequent. It may be a question, in this case, whether the state of syncope increases until it induces sickness; or whether the stomach be nauseated by the ingesta usually administered, and the syncope be, in part, an effect of this state of the stomach. In any case the efforts to vomit, are succeeded, for a time, by an ameliorated state of the patient.

In cases of fatal hæmorrhagy there are none of these ameliorations. The symptoms gradually and progressively assume a more and a more frightful aspect: the countenance does not improve but becomes more and more pale and sunk; the consciousness sometimes remains until at last there is some delirium; but everything denotes an impaired state of the energies of the brain; the breathing becomes stertorous and at length affected by terrible gasping; there may be no efforts to vomit; the pulse is extremely feeble or even imperceptible; the animal heat fails, and the extremities become colder and colder in spite of every kind of external warmth; the voice may be strong, and there are constant restlessness and jactitation; at length the strength fails, and the patient sinks, gasps, and expires.

From the state of syncope the system usually recovers itself spontaneously, if the cause by which the syncope was induced, be discontinued. The principle by means of which this recovery is effected, may, without involving any hypothesis, be denominated *reaction*.

This reaction of the system may, under different circumstances, be excessive or defective, or it may be destroyed altogether, and yield to an opposite condition of the vital powers, or *sinking*, or to dissolution, each state leading to a corresponding series of phenomena. The description of these varied phenomena is reserved for the ensuing chapter.

2. *Of Convulsions.*

Convulsion is, after syncope, the most familiar of the immediate effects of loss of blood. It is most apt to occur in children, and in cases of the slow and excessive detraction of blood.

Convulsion obviously arises from an affection of the brain. It is that phenomenon which denotes most distinctly that the brain may be similarly affected in opposite states of the general system; an observation as old as Hippocrates, who observes σπασμος γινεται ἡ ὑπο πληρωσιος, ἡ κενωσιος. This remark applies not only to convulsive movements of the voluntary muscles, but to those of the respiratory system. In this manner, indeed, I believe, an affection resembling croup

is sometimes induced, which is very apt to be mistaken and mistreated for croup itself.

The general principle of the affection of the brain from a state of inanition or exhaustion of the vascular system, is one to which I shall have occasion repeatedly to advert in this work. It is also one of the utmost interest in physiology, and of the utmost moment in practice. In the case of convulsion as an immediate effect of loss of blood, their connexion and relation are obvious. But in some other instances it requires much attention to trace them. In every case of convulsion the local treatment must be similar in principle though very different in degree; whilst the constitutional treatment must of course be of a directly opposite kind, in the two cases of repletion and of exhaustion of the general system.

Convulsions occurring from blood-letting must, I think, be generally considered as denoting that the remedy has been used beyond the safe degree. It is most apt to occur in cases in which the patient has been freely bled in a more or less recumbent position, in which the blood has flowed slowly, or in which time has been lost during the operation. In such cases much blood usually flows before syncope is observed, too much to be safe; in such circumstances we should therefore be very cautious how we bleed to deliquium. The following case, given to me by a friend, was one in which for a short time some alarm was felt lest the patient might not rally at all.

A physician, aged thirty-four, became affected with inflammation of the larynx. He was bled freely on two successive mornings at his own instance. In the afternoon of the second day, the disease being unsubdued, he was bled a third time, placed in a rather inclined position upon a sofa. The blood was allowed to flow until thirty-four ounces were taken. He then suddenly fell upon the floor violently convulsed; and he remained for some time afterwards in such a state of syncope as to render his recovery very doubtful; being carried to bed, however, and cordials being administered, he slowly recovered. He did not afterwards suffer from the secondary effects of loss of blood.

A similar case is given by Mr. Travers. This gentleman observes, "Some patients cannot bear the loss of blood: it gives rise to prostration, attended with convulsions, in which the circulation fails so alarmingly as to require watching for several hours and the repeated administration of stimulants to restore it. A very intelligent surgeon in the neighbourhood of London, in bleeding a clergyman to the extent of twenty ounces, whose idiosyncracy in this respect was not known, was compelled to remain with him during the whole of that day; and notwithstanding frequent recourse to brandy, continued long apprehensive for the patient's life. He represented the convulsions, which returned in paroxysms, as resembling the puerperal in their severest form.

There has been reason to believe that the loss of blood in operations in which hæmorrhage was unavoidable, has sometimes induced this state; this, however in the present advanced state of surgery is rare."*

The same author observes, "The unavoidable effusion of blood in operations, though insufficient to create alarm for the patient's safety on that score, obviously predisposes to the convulsions which sometimes prove fatal, especially to children. I have known an infant die of convulsions on the day after the removal of a nævus from the scalp, of no extraordinary size, and without any after hæmorrhage."†

Convulsion from loss of blood constitutes one species of puerperal convulsion, and should be accurately distinguished from other forms of this affection, arising from intestinal or uterine irritation, and an immediate disease of the head.

It is well known that infancy is extremely prone to convulsion, from various causes. This is particularly observed in relation to loss of blood.

In Dr. Kellie's interesting experiments upon dogs and sheep, convulsions were found to be a frequent consequence of the vascular exhaustion.

* On Constitutional Irritation, p. 501.

† Ibid. p. 401.

3. *Of Delirium.*

Delirium occurs as an immediate, as mania occurs as a more remote, effect of loss of blood.

A young man, aged thirty, had lost much blood from the arm, and by leeches, and under the influence of a brisk purgative, fell into complete syncope; instead of laying him recumbent, his ignorant friends kept him in the erect position during an hour and a half, and thus protracted the state of deliquium during the whole of this period. He was found perfectly colourless and senseless, and affected with rattling in the breathing. Being laid down, he made a convulsive effort to expectorate, and the blood rushed into his cheeks; in half an hour he began to recover, opened his eyes, and complained of deafness; the pulse was frequent. The rattling gradually subsided, and he regained a degree of warmth under the influence of brandy and fomentations.

To these phenomena succeeded severe rigor, followed by great heat of skin, constant delirium with continued though diminished deafness. The delirium did not cease during the night. On the following morning it was only occasional, and the deafness slight.

This state was followed by numbness of the feet and legs, and great fear of choaking on going to sleep.

The patient gradually recovered.

Another patient fell and hurt his back. On three successive days he was freely bled from the arm and by cupping, and purged. On the evening of the third day he was again bled. This was followed by faintness, sickness, and retching, and much affection of the head.

I saw this patient very early on the following morning. There was great pallor, tinnitus aurium, with extreme intolerance of noises, and of the light, and sighing breathing. To these symptoms succeeded great hurry and alarm of mind, with extraordinary noises and visions, delirium, weeping, and sighing. At length continued delirium supervened, and finally wore out the patient.

The following case is remarkable by combining convulsion with delirium:

Mrs. ——, miscarried on the third month of her pregnancy. There was considerable flooding. On unthinkingly getting out of bed for some purpose, there was a sudden profuse gush of blood. She turned pale and nearly fainted. She was promptly carried and laid upon the bed, but soon became affected with convulsion. This was succeeded by delirium, which continued during two hours. A little brandy and water was given. She recovered in a few days.

As might have been anticipated, delirium frequently occurs as an immediate effect of hæmorrhagy during

parturition. Still more frequently mania occurs as a remote effect of loss of blood.

It is important to remark that delirium may occur even from the loss of a very small quantity of blood, in those cases in which there is what I have ventured to term intolerance of loss blood, or in other words, great susceptibility to its effects, a subject which will be fully discussed in the Second Part of this work.

Mrs. ——, aged 40, had been, for some time, under medical treatment for a small tumour in the mamma. She was seized with rubeola; on the first and second days of the rash she was purged freely; too freely; on the third she was bled to eight ounces, and six leeches were applied to the chest, for a slight oppression felt there. Mrs. —— had also passed five nights totally without sleep, although on the evening of the second day she had taken twenty-five minims of the tincture opii.

Under the influence of these circumstances, Mrs. —— was seized with delirium. I saw her on the fourth day; there were constant delirium, a profuse perspiration, a trifling rash, and a feeble pulse of 120. I gave fifty drops of tinctura opii, and one dram of the spiritus ammoniæ aromaticus.

I saw Mrs. —— again in four hours; the delirium had subsided into a state of obstinate silence, the patient sitting up in bed, refusing to answer questions, and having had no sleep; the skin and pulse as be-

fore. I directed one ounce of brandy to be given every hour, with beef tea.

The first dose of brandy had produced sleep. It was directed to be continued every hour, at my visit in the morning.

On the morning of the second day I was informed that eight ounces of brandy had been taken during the night; and that there had been much quiet sleep. I found the patient collected, the pulse 108, and less feeble; the skin still in a state of perspiration. The brandy was directed to be given every second hour. In the evening there was still further amendment. The bowels not having been moved, an aperient draught was prescribed to be taken early in the morning.

This draught acted thrice. The delirium returned, and was removed by the brandy, which again procured sleep.

From this time there was no recurrence of delirium. The perspiration kept profuse for some days, but gradually subsided; the pulse became gradually slower and stronger. There was afterwards a protracted affection of the chest.

Puerperal mania from hæmorrhagy is rather to be ranked amongst the secondary effects of loss of blood, and will be slightly discussed in its proper place.

4. *Of Coma.*

We may be called to patients so perfectly comatose, immediately after blood-letting or hæmorrhage, that we may be in doubt for a time whether the case be not apoplexy. The history, the state of the countenance, of the pulse, and of the extremities, and the other symptoms will, after a little watching, make the case clear to us.

I do not find that I have preserved the notes of any case of this kind in adults; but the reader will find in the appendix to this volume a rather minute account of such a morbid state occurring in infants and children.

Mr. C. Bell observes, "when a man who has cut his throat is brought into the hospital, he is in a state very much resembling that which some authors have described as accompanying severe wounds. Though sensible, he is cold, pale, taciturn, and very often, although such men are desirous of living, they sink within twenty-four hours. This appears at first to proceed from a strong impression on the mind; that is, I believe, the consequence of loss of blood, and the shock thus given to their powers of life."*

* Surgical Observations, Part iii. page 335.

5. *Of Sudden Dissolution.*

I have pointed out, pages 10—13, some circumstances in which blood-letting has led to sudden dissolution, and I have recorded in a recent work,* several instances of this kind. To these I must refer the reader. The subject will be again mentioned in the second part of this volume, in which the cases in which this sad event is most apt to occur, will be accurately pointed out.

An interesting account of a case of this kind is given in the Lancet, vol. xi. p. 94. "Arthur P., a stout muscular man, about 57 years of age, was brought to the hospital, early on Friday morning, in consequence of a fall from a scaffold a few minutes previously. On examining into the nature of the accident, the fourth, fifth, and sixth ribs were discovered to be fractured near their angles. Their fractured ends having been pushed inward, through the intercostal muscles, pleura costalis, the pulmonalis, into the substance of the lungs, the air had consequently escaped into the thorax, and through the pleura and lacerated muscles into the cellular tissue on the outside of the chest. The patient at this time complained of a considerable tightness of the chest, with pain chiefly in the situation of the fractures.

* Commentaries on some Diseases of Females, p. 286.

His inspiration was somewhat short and rapid; the pulse was at first weak and contracted, but in a very short time became full and hard. In addition to these symptoms, he had cough, attended with expectoration, as well as severe pain in the head. The crepitation was for the most part confined to the integuments covering the left side of the thorax. He was bled by the dresser to eighteen ounces, and at noon he was ordered to lose twenty ounces more, to take a dose of house medicine occasionally, and to have a bandage applied closely.

The blood drawn yesterday had a decidedly inflammatory character, and after the abstraction of it, the patient expressed himself relieved. He has passed an indifferent night, and is much annoyed by a troublesome cough. Pulse quick; tongue slightly coated; bowels open; ordered to be bled to eighteen ounces, and to take common linctus for the cough.

Noon.—Still complains of pain about the seat of the injury, but in a much less degree than before; the emphysema has not extended beyond its former boundaries; free from pain in his head, and on the whole expresses himself better. Pulse 90, full, and rather jerking; tongue moist. Ordered to lose eighteen ounces of blood immediately, and a similar quantity in the evening.

He passed a good night, and this morning we find him capable of talking cheerfully with a friend. Expresses himself free from all pain. Emphysema just

the same; expectorates freely; pulse small and jerking, but very compressible. The blood drawn yesterday has not the slightest appearance of inflammation.

Mr. Lloyd ordered the patient to lose eighteen ounces of the blood, considering, as we suppose, the state of the pulse as indicative of inflammation, and not as resulting from loss of blood, hæmorrhagic irritation, as this state has been called. The dresser, however, perceiving what effect even the loss of a few ounces had, desisted from drawing any more. About two hours subsequently, Mr. Lawrence saw the patient, and concurred with Mr. Lloyd, as to the propriety of the further abstraction of blood; they therefore directed twenty ounces of blood more to be drawn. The pulse after this time became a mere flutter, and the man only survived a few hours.

On examination the fourth, fifth, and sixth ribs were found to be fractured near to their angles; the left lung was considerably torn and collapsed, and into the left cavity about a pint of bloody fluid was found effused. The right lung was quite healthy, but appeared very light coloured from the almost total absence of blood in it. The left lung sank on being placed in water; it appeared going into a state of hepatization. Here and there the pleura pulmonalis was detached from the lung by means of the extravasated air, and presented a tuft-like appearance.

The vessels about the heart were quite empty, neither was there any fibrine found in the ventricles,

the whole organ being of a very pale colour. The right cavities bore no proportion to the left, the former being considerably larger, and the coats thinner than the latter. The liver was of a very light colour. The spleen was found to be particularly tinged with blood. On removing the skull cap the dura mater presented a vascular appearance; but the pia mater and the substance of the brain were almost colourless, The man was observed to have a reducible inguinal hernia on the right side. On examining the contents of sac, it was found to be omentum."

CHAPTER III.

OF THE MORE REMOTE EFFECTS OF LOSS OF BLOOD, OR EXHAUSTION.

1. *Of Exhaustion with excessive reaction.*

Exhaustion may assume several different characters. It may be attended with excessive or with defective reaction, or with actual sinking of the vital powers; its prominent symptoms may be delirium, or coma. With each of these it is very important that the physician should be accurately acquainted. I proceed to describe that form of exhaustion which is attended with excessive reaction.

The reaction or recovery from ordinary syncope is generally a simple return to a healthy state of the functions, or nearly so, the pulse not passing beyond its natural frequency. In cases of profuse loss of blood, on the contrary, the recovery is not quite so uniform, and the pulse acquires and retains a morbid frequency for a certain length of time; this frequency of the pulse may gradually subside, however, and be unattended by any other symptom of indisposition of any consequence.

The phenomena are very different, if, instead of one full bleeding to syncope, or of a profuse hæmorrhagy, and even protracted syncope, the person be subjected to repeated blood-lettings or to a continued drain. In this case, within certain limits, the pulse, instead of being slow and feeble, acquires a morbid frequency and the throbbing beat, and there are, in some instances, all the symptoms of excessive reaction.

This state of excessive reaction is formed gradually, and consists, at first, in forcible beating of the pulse, of the carotids, and of the heart, accompanied by a sense of throbbing in the head, of palpitation of the heart, and eventually perhaps of beating or throbbing in the scrobiculus cordis, and in the course of the aorta. This state of reaction is augmented occasionally by a turbulent dream, mental agitation. or bodily exertion. At other times it is modified by a temporary faintness or syncope. There is also sometimes irregularity of the beat of the heart and of the pulse.

In the more exquisite cases of excessive reaction, the symptoms are still more strongly marked, and demand a fuller description.

The beating of the temples is at length accompanied by a throbbing pain of the head, and the energies and sensibilities of the brain are morbidly augmented; sometimes there is intolerance of light, but still more frequently intolerance of noise and of dis-

turbance of any kind, requiring stillness to be strictly enjoined, the knockers to be tied, and straw to be strewed along the pavement; the sleep is agitated and disturbed by fearful dreams, and the patient is liable to awake or to be awoke in a state of great hurry of mind, sometimes almost approaching to delirium; sometimes there is slight delirium, and occasionally even continued delirium; more frequently there are great noises in the head as of singing, of crackers, of a storm, or a cataract; in some instances there are flashes of light; sometimes there is a sense of great pressure or tightness in one part or round the head, as if the skull were pressed by an iron nail or bound by an iron hoop.

The action of the heart and arteries is morbidly increased, and there are great palpitation, and visible throbbings of the carotids, and sometimes even of the abdominal aorta, augmented to a still greater degree, by every cause of hurry of mind or exertion of the body, by sudden noises or hurried dreams or wakings; the patient is often greatly alarmed and impressed with the feeling of approaching dissolution; the state of palpitation and throbbing are apt to be changed, at different times, to a feeling of syncope; the effect of sleep is in some instances very extraordinary, sometimes palpitation, at other times a degree of syncope, or an overwhelming feeling of dissolution; the pulse varies from 100 to 120 or 130, and is

attended with a forcible jerk or bounding of the artery.

The respiration is apt to be frequent and hurried, and attended with alternate panting and sighing; the movement of expiration is sometimes obviously and singularly blended with a movement communicated by the beat of the heart; the patient requires the smelling-bottle, the fan, and the fresh air.

The skin is sometimes hot; and there are frequently general hurry and restlessness.

In this state of exhaustion, sudden dissolution has sometimes been the immediate consequence of muscular effort on the part of the patient, or of his being too suddenly raised from the recumbent into the erect position.

The following case strikingly illustrates the phenomena of reaction from a continued drain or loss of blood.

Mrs. —— aged 28, of a stout constitution. After delivery there was uterine hæmorrhagy, which continued to recur for the twelve subsequent months. It was then discovered that Mrs. —— laboured under polypus uteri; a ligature was applied, purgative medicines given, and the patient recovered. The effects of this loss of blood followed, however, and there were, 1. beating of the temples, a sense of violent 'knocking' in the head, pain, vertigo, dimness of sight, and singing in the ears, terrific dreams, and starting from sleep; 2. frequency of the pulse, pul-

sation of the carotids and aorta, fluttering and beating of the heart, faintishness, and a sense and fear of dissolution ;—the palpitation of the heart was sometimes such on awaking as even to move the bedclothes, the bed, and, it is said, even the door ; 3. the breathing was short and hurried, sometimes with panting, sometimes with sighing ; 4. there were urgent calls for air, for opened windows, and the smelling bottle, and the nostrils and temples were required to be bathed with sal volatile or vinegar.

The countenance, prolabia, and tongue were pallid ; the legs somewhat œdematous ; the bowels were irregular, the secretions morbid ; once there was obstinate constipation ; frequently the bowels were merely confined, sometimes with sickness, but always with an increase of all the symptoms.

The state of reaction as an effect of repeated loss of blood is interestingly pourtrayed in the following case, for which I am indebted to a friend.

" Mrs. —— a delicate, married person, aged 24, a week or ten days after her confinement of a stillborn child, was seized with pain at the lower part of the abdomen, extending to the liver, and other symptoms which indicated inflammation of the os uteri, together with much constitutional disturbance ; the case seems to have been mistaken in the beginning, so that it was allowed to become somewhat inveterate before the appropriate treatment was adopted. It was at this stage treated with leeches to the hypogas-

trium, cupping low in the loins, the hip-bath, aperient medicines, strict abstinence, &c.

"The benefit accruing from cupping over the sacrum was observed to be so decided, that recourse was had to this remedy twice or thrice a week regularly. The disease seemed to be thus yielding in the most favourable manner, when the patient became suddenly and quite unexpectedly, affected with the effects of loss of blood, in a most violent form. The quantity of blood taken by the cupping had frequently been twenty ounces; and too exclusive attention had been paid to the disease, the state of the constitution not being sufficiently watched. In this manner, the patient became affected, all at once, after being cupped, with sudden and alarming syncope; she gasped, and became convulsed, and afterwards slightly delirious. The admission of the cold air, and the administration of brandy, gradually restored the patient to sensibility, but she remained extremely feeble.

"On the next morning, Mrs. —— was affected with extreme pain of the head, violent throbbing of the temples, slight delirium, and sickness; the street was found covered with straw.

"During this day, the pain of the head, the throbbing, and the intolerance of light and of sound, had increased so much, with sickness, feverishness, and a frequent strong pulse, that it was apprehended that inflammation had taken place in the brain. The

arm was actually tied up for blood-letting; but the remonstrances of the patient, the history of the attack, and the recollection of some remarks on the effects of loss of blood read some years before, happily led to the abandonment of this measure."

My friend candidly observes, "fortunately both for my patient and for myself, her repugnance to general bleeding prevented me from using the lancet, and so saved her life; I prescribed leeches to the temples, a blister to the nape of the neck, and a cold lotion to the head; opiates and the effervescing medicines were immediately rejected. My patient became much better. She earnestly requested to be allowed a little brandy; I gave it her; it obviously afforded much relief, and I began clearly to see the nature of the case." From this time light cordials, a mild diet, rest, quietude, a strict attention to the state of the bowels, constituted the treatment, and it was followed by a gradual and progressive amendment.

Some of the symptoms remained, however, for some time. The pain of the head continued very troublesome for many weeks, and a pulsatory movement in the side of the neck harassed the patient for several years. My friend adds, "in this case the effects of loss of blood on the constitution stole almost imperceptibly on me, and I was not then aware that such symptoms as you have detailed in your work would arise. This case also has made me attend very much to the prejudices of a patient ever

since, and carefully examine whether they be well-founded. In this instance I really believe my yielding to them saved the life of my patient."

Since my first publication on this subject, in 1820, I have seen several allusions to it in various works, and one especially by Mr. Cooke, in his useful and able abridgment of Morgagni. The observations of this author are indeed highly valuable, and they have been fully confirmed by Dr. Kellie. Mr. Coke remarks, "After uterine hæmorrhage, and also after copious depletion on account of pulmonary and other inflammations, I have frequently observed the symptoms of cerebral congestion; and which has generally appeared to arise from the excitement occasioned by some mental effort, though occasionally it has arisen without an evident cause. Whilst the other parts of the body appear comparatively bloodless, the vessels of the head throb violently; there is severe pain; confusion of intellect, sometimes to such a degree as to threaten delirium; the pulse at the wrist is usually small and vibrating, and the countenance distressed. When I first observed these symptoms I was led to abstract blood, from an apprehension of phrenitis: but I did harm; for if the urgency of symptoms was diminished, the susceptibility to a recurrence was increased, and restoration to health was protracted. The liability to this form of cerebral plethora has appeared to me to be proportionate to the preceding hæmorrhage, and the

consequent debility. If in this condition an intrusive visitor be admitted to converse, though but for a short time, with the patient—or if the patient attempt to read, or in any other way to employ the mental faculties beyond what is perfectly easy—or if the mind be agitated, this state of the head will almost inevitably be induced. It may, however, be brought on by all those causes which tend to destroy the equilibrium or circulation; and none are more likely in this condition of the patient, than noise in the room, deficiency of sleep, improper food, a constipated state of the bowels, or a morbid state of the secretions into them. This susceptibility to local congestion after excessive loss of blood, I presume depends upon the want of that due balance which, in a state of health, subsists between the nervous and vascular systems; but I am jealous of hypothesis in medicine, and to pursue them in the present work would be unwarrantable." Vol. I. p. 73.

"From the peculiarity of the conformation of the nose, epistaxis is sometimes a most uncontrollable form of hæmorrhage. I have recently seen two cases in which if it were not absolutely the occasion of death, it certainly accelerated that event. The first was in a gentlemen who laboured under hydrocephalus. He was a susceptible man and would not endure a plug in the nostril. The hæmorrhage frequently recurred; and when he had become exceedingly pallid from loss of blood, it was curious to

observe to what an extent the irritative hæmorrhagic action was propagated. At first he only distinguished pulsation in and about the nose, but as his strength decreased, and his anxiety and susceptibility were heightened, the carotids could be seen throbbing vehemently, and a corresponding action was perceptible to the patient through their ramifications. The second case was in an old arthritic sufferer, who had been seized with cynanche parotidæa. The more acute inflammation had subsided, but the gland was much enlarged and indurated, and the jaw nearly rigid. In this state he was attacked with bleeding from the nose. It occurred sometimes when he was asleep, on which occasions he was threatened with suffocation from the formation of coagula in the fauces, which he removed with the utmost difficulty, in consequence of being unable to open his mouth. The hæmorrhage commenced in the nasal cavity nearest to the enlarged gland, but it afterwards took place from both nostrils. He was excessively afflicted with gout, and had indications of hepatic disorganization; but the immediate cause of death was the repeated effusion of blood. The hæmorrhagic action was not so extensively manifest as in the preceding case; but when there was feebleness in the radial artery, and the extremities were cold, the patient was conscious of a strongly irritative throbbing in the arteries ramifying through the nose and the circumjacent parts." Vol. I. p. 191.

More recently I find several interesting cases of this kind in the late admirable work of Dr. Abercrombie.

"A gentleman, aged about 40, had been for some time losing considerable quantities of blood by arterial hæmorrhage from the rectum. Considering it as merely hæmocidail, he had paid little attention to it until his friends became alarmed by his altered appearance. From being strong and rather plethoric, he had become weak, exhausted, pale, and haggard. He had an asarca of his legs; his pulse frequent and feeble, and much excited by the least exertion. Along with these symptoms, he was liable to strong and irregular action of the heart, and complained of giddiness, tinnitus aurium, violent throbbing in the head, and frequently of throbbing head-ache. On examining his rectum, a fungous tumour was found within the sphincter, on the apex of which a small artery was bleeding, per sultrum. This was tied and there was no return of the hæmorrhage; and under the use of nourishing diet, and a liberal allowance of wine, all his other complaints disappeared. He made up so rapidly in flesh and blood, that not long after apprehensions were entertained that he was becoming too plethoric, and it became necessary to reduce his regimen, but under these circumstances he had no return of the symptoms in the head.

"A lady, aged 25, had been frequently bled on account of symptoms in the head which had super-

vened upon an injury. Considerable relief had followed each bleeding; but the symptoms had soon returned so as to lead to a repetition of the bleeding at short intervals, and this had been going on for several months. When I saw her she was stretched upon a couch, her face of the most death-like paleness, or rather of the paleness of a stucco figure, her pulse very rapid and as small as a thread, her general weakness extreme. The mass of blood appeared to be reduced to the lowest point that was compatible with life, but she still complained of frequent headache, violent throbbing in the head, confusion and giddiness. It was evident that evacuation could be carried no further, and in consultation with a very intelligent medical man who had the charge of her, it was agreed as a last experiment, to make a trial of the opposite system, nourishing diet and tonics. In a fortnight she was restored to a very tolerable health.

"I have been repeatedly consulted under the following circumstances. A gentleman accustomed to very full living, is seized with an apoplectic attack, or with symptoms indicating the most urgent danger of apoplexy; he is saved by bleeding and other free evacuations, and is kept for some time upon a very spare diet. His complaints are relieved, and as long as he keeps quietly at home, he goes on without any uneasy feeling. But when he begins to go about, he becomes liable to attacks of giddiness and confu-

sion, generally accompanied by palpitation of the heart, and an uneasy feeling about the præcordia. His pulse is now soft and rather weak, and his general appearance indicates the reverse of plethora, and these symptoms are removed by a cautious improvement of his regimen. This curious fact I have repeatedly had occasion to attend to in the treatment of cases of this kind, and it has always appeared to me to be of a very great interest in reference to the pathology of the brain."*

2. *Of Exhaustion with defective reaction.*

The phenomena of excessive reaction are most observed in young persons of a robust constitution, who have been subjected to repeated blood-letting. In infants, in feeble persons, and in rather advanced years, reaction after loss of blood is apt to be defective. In this case the patient remains long pale, thin and feeble, and becomes faint on the slightest occasions; there are deafness and dozing, from which the patient is apt to be startled by sudden loud noises; the pulse is frequent, but feeble and perhaps irregular, and we shall look in vain for the throbbing and palpitation observed in the young and robust. This state either gradually yields to returning strength, or subsides into the state of sinking. In the study of

* Researches on Diseases of the Brain, pp. 308—310.

the effects of loss of blood it is particularly necessary to bear in mind this difference of the phenomena arising out of the state of the constitution, of vigour, or of feebleness of the patient.

3. *On Exhaustion with Sinking.*

The symptoms of exhaustion with excessive reaction may gradually subside and leave the patient feeble but with returning health; or they may yield to the state of sinking. This term is adopted not to express a state of negative weakness merely, which may continue long and issue in eventual recovery, but to denote a state of positive and progressive failure of the vital powers, attended by its peculiar effects, and by a set of phenomena very different from those of exhaustion with reaction.

If in the latter the energies of the system were augmented, in the former functions of the brain, the lungs, and the heart are singularly impaired. The sensibilities of the brain subside, and the patient is no longer affected by noises as before; there is, on the contrary, a tendency to dozing, and gradually some of those effects on the muscular system which denote a diminished sensibility of the brain supervene, as snoring, stertor, blowing up of the cheeks in breathing, &c.; instead of the hurry and alarm on awaking as observed in the case of excessive reaction, the patient in the state of sinking, requires a

moment to recollect himself and recover his consciousness, is perhaps affected with slight delirium, and he is apt to forget the circumstances of his situation, and, inattentive to the objects around him, to fall again into a state of dozing.

Not less remarkable is the effect of the state of exhaustion with sinking on the function of the lungs; indeed the very first indication of this state is, I believe to be found in the supervention of a crepitus in the respiration, only to be heard at first on the most attentive listening; this crepitus gradually becomes more audible and passes into slight ruttling, heard in the situation of the bronchia and trachea; there is also a degree of labour or oppression, sighing, hurry, blowing, in the breathing, inducing acuteness in the nostrils, which are dilated below and drawn in above the lobes at each inspiration; in some cases there is besides, a peculiar catching, laryngal cough, which is especially apt to come on during sleep, and awakes or imperfectly awakes the patient.

The heart has at the same time, lost its violent beat and palpitation, and the pulse and arteries their bounding or throbbing.

The stomach and bowels become disordered and flatulent, and tympanitic, and the command over the sphincters is impaired.

The last stage of sinking is denoted by a pale and sunk countenance, inquietude, jactitation, delirium, and coldness of the extremities.

The symptoms of exhaustion first met with reaction, but gradually passing into the state of sinking, are exemplified in a remarkable manner in the following case, the circumstances of which were the more accurately noticed as they occurred in the person of a much respected friend and intelligent member of the profession, and principally under my own roof.—Mr. ——, aged 40, of an extremely muscular and robust make, was returning from Nottingham into the country on the 3rd of October, 1821, when his horse reared, fell backwards upon him, and fractured the third and fourth ribs of the left side of the chest; he was taken to an inn, and I saw him with a surgeon, early on the following morning. He then suffered extreme pain of the side, there was a distinct crepitus, but no emphysema; the face was somewhat bruised and swollen and ecchymosed; the pulse was 100 and strong. Sixteen ounces of blood were taken from the arm, and a dozen leeches were applied to the temples and the same number over the fracture of the ribs; the motions of the chest were restrained by a tight bandage, and calomel and purging medicine were freely given. At noon sixteen ounces of blood were again drawn from the arm, and a surcingle was applied round the chest.—During the whole of the 5th of October, or second day after the accident, Mr. —— appeared to be going on well, but at night a violent attack of pain of the side induced him to bleed himself; this was done to syncope,

and as a large wash-hand basin was used to receive the blood, its quantity was not known but must have been very considerable; seventeen leeches were then applied to the side and shoulder; great relief was obtained, and the surcingle which had been removed, was re-applied, and the mercury and purgatives were continued.—Early on the morning of the *third* day, there was another violent attack of pain of the side with dyspnœa; a messenger was despatched for the medical attendants, but before their arrival Mr. —— had again bled himself, and taken sixteen ounces of blood, being unable to endure the pain; in another hour eight ounces more blood were drawn, the patient sitting upright; this was followed by syncope and great relief from the pain.

On the fourth day Mr. —— was removed a distance of about one mile to my house, and bore the journey on a litter extremely well, having previously lost a teacupful of blood; he expressed himself as feeling better than at any time since the accident. In the evening an increase of pain took place and about seven ounces of blood were taken with great relief.

In all it would appear that Mr. —— lost at least 120 ounces of blood.

On the fifth day we were joined in consultation by an eminent physician and surgeon. There was much pain of the side; and it was at first proposed to take away more blood. But as I had observed some of

the symptoms which I knew to indicate reaction from exhaustion, the venæsection was omitted, and the application of leeches only was proposed; the symptoms, however, increased, and the leeches were not applied.

On the sixth day the following circumstances were noticed. There was some degree of dyspnœa and of pain in the side; and the patient had removed the surcingle in the hope of obtaining relief; the mouth was affected with ptyalism. The pulse was 100, and had acquired a peculiar jerk; there were violent throbbings of the carotids, a pulsatory pain of the head, and intolerance of noise, and, in a slight degree, of light; at one time in the morning of this day great agitation had been induced by a knock at the door. On account of the intolerance of sound, it was directed that the pavement should be strewed with straw, and that the ringing of the bells of the adjacent church should be avoided. The bowels were freely moved; a draught with tinctura opii, and spiritus ammoniæ aromaticus was given, with broth, arrow-root, sago, &c.

Seventh day. The patient was rather better towards yesterday evening. All the symptoms of strong reaction continued as before. The head has been much relieved by the application of a cold lotion.

On the succeeding day the pulse was only 84, and had lost, in some degree, its peculiar jerk; the caro-

tids beat less violently; the head was so much better as to render the lotion unnecessary; there was more tranquillity and some hilarity of mind. The aperients, the anodyne, and the nourishments were continued.

I saw my patient about 3 o'clock, A. M. on the ninth day, and I then heard the slightest degree of that crepitus in the breathing, which I have already noticed as one of the first symptoms of sinking. The medical gentlemen met at nine, and the general symptoms were then so little changed, that no degree of alarm was excited in their minds. I mentioned my fears, and the ground on which they were formed. At this meeting cupping was proposed; but the changes in the patient were afterwards so rapid that in the evening brandy was recommended. The pulse was 110 in the middle of the day, unattended with its previous force and jerk, and easily compressible; the beating of the carotids had subsided; a slight degree of stupor was observed; on being left undisturbed, the patient fell asleep and snored; there was some labour in the respiration, and a troublesome, dry, laryngal cough; and, although the bandage was loose, there was no pain of the side of the chest: the countenance was anxious.

The symptoms gradually assumed a more and more alarming form during this day; at night there was considerable stupor, and when the patient was roused there was sometimes a degree of delirium; during this sleep there were much snoring and puffing

up of the cheeks in expiration, something like the symptom which the French writers call "fumer la pipe;" on awaking, he would feel greatly concerned that he should have appeared to blow in your face; there was much flatulence: the motions were extremely offensive, and passed at each attempt to void urine.

After midnight he could scarcely be roused; but if awakened, he would speak collectedly, but in a hurried manner, and said he felt "such a dying feel;" the pulse was about 120. I saw my patient at 3 o'clock, A. M. there was little change in the pulse or other symptoms; but, in a minute or two, the pulse became slow, feeble, and irregular, he altered rapidly, and I found that he was moribund; within a few minutes more he expired.

On dissection, the pleura was found morbidly red in the vicinity of the fracture, but not wounded; there was some effusion of lymph in its cavity. The right lung was found united to its contiguous pleura by old adhesions.

For the following valuable case illustrative of so many of the effects of exhaustion from loss of blood extracted from the Acta Physico-Medica Academiæ Naturæ Curiosorum; 4to. Norimberg. 1737. Vol. iv. 535, 536, I am indebted to my friend, Dr. Stroud.

"Obs: 136; Dom. D. Christopheri Jacobi Trew. De Cephalalgia sævissima, venæsectionem justo lar-

giorem sequuta: postea que amaurosin, et denique cerebri hydropem producente.

Mulier mediocris habitus, sanguineo-cholerica, aliquot annorum spatio cephalalgia laborare cœpit periodica, et sæpius recurrente; nullum, tanem, typum servante, nec causam manifestante; contra quam auxiliam in venæsectione, bis quotannis nunc in pede nunc in brachio repetita, quæsivit atque invenit. Hac, vero, anno ætatis ejus quadragesimo secundo, in brachio iterem administrata, accidit ut chirurgus, dum sanguis flueret cum adstandibus confabulatus, quantitatem sanguinis profusi tunc demum animadverteret postquam pelvin satis capacem repleverat, et afflicta, ex subitaneo dolore acutissimo caput quasi perforante exclamans, illum advocaverat. Clamorem editum illico sequebatur, gravis lipothymia; qua dissipata, eodem momento cephalalgia non solum recruduit vehementissima, verum etiam dies noctesque sæviit, eademque vehementia tres integros annos continuavit, miseramque lecto penitus affixit. Longus foret sermo instituendus, si omnes quas ægra interea passa est calamitates, quasque contra illas periclitata est medicinas, exponendæ essent. Nobis sufficet annotare medelam semper frustra expectatem, querelas, vero, solum de intolerabilibus ictibus atque pulsationibus caput ferentibus effusas esse; cæteroquin vires permansisse invictas, omnesque corporis functiones naturales, ipso tributo lunari et appetitu integro non excepto, legitime successisse; tandemque, in

miseriæ complementum, tertia ante obitum hebdomade, tristissimam subito supervenisse cæcitatem ex vera amaurosi plenariam ; his omnibus, autem, anno ætatis quadragesimo quinto, subitaneam mortem fecisse finem.

Sectio defuncti corporis concessa nullum alium manifestavit statum morbosum quam hydropem cerebri, seu lympham flavam, non solum sub pia matre, per universum ejus ambitum, et quidem in singulis vasorum arcolis seorsim collectam, sed, etiam, onmes ipsius cerebri cavitates seu ventriculos replentem. Quæ, tamen, lymphæ extravasatio, sine dubio, effectus potius quam causa phœnomenorum, si mortem excipias repentinam, dici meretur.

It would, perhaps, be difficult to offer any observations on the nature and cause of excessive reaction : but it is plain that the state of sinking involves a greatly impaired state of the functions of all the vital organs, and especially of the brain, from defective stimulus. The tendency to dozing, the snoring and stertor, the imperfect respiration, the impaired action of the sphincters, the defective action of the lungs, and the accumulation of the secretions of the bronchia, the feeble and hurried beat of the heart and pulse, the disordered state of the secretions of the stomach and bowels, and the evolution of flatus, all denote an impaired condition of the nervous energy. The state of sinking may, indeed, in certain points of view, be compared with the state of the functions in apoplexy :

and to the effects observed on abstracting the influence of the brain and spinal chord by dividing the eighth pair of nerves, or by destroying the lower portion of the chord.*

There are many very interesting though cursory notices of the subject under discussion, in the recent work of M. Andral, entitled, 'Prêcis d' Anatomie Pathologique,' under the head of 'Anemie,' confirmatory of the views which I have laid before the profession.

At the 81st page of his first volume, M. Andral observes, „ Lorsque l'économie vient à perdre, en un court espace de temps, une très-grande quantité de sang, l'action de plusieurs organes est singulièrement troublée: ainsi l'on observe de graves désordres dans le système nerveux: non seulement il y a des lipothymies, des défaillances; mais, au milieu de la diminution réelle des forces qu'a produite la soustraction du sang, appraissent des phénomènes qui sembleraient ne devoir résulter que de la sur-excitation des centres nerveux: du délire survient, des convulsions se manifestent; le cœur devient le siége de palpitations; la respiration est difficile, comme dans les cas de congestion pulmonaire; dans ce dernier cas, il y a dyspnée, parce qu'il y a trop de sang relativement à l'air, qui entre dans les bronches: dans le cas d'anémie, il y a aussi dyspnée, mais par une cause con-

* See Dr. Philip's work on "The Vital Functions" passim.

traire; parce qu'il a trop d'air relativement au sang que l'air doit vivifier; c'est comme lorsqu'on place un animal sous une cloche remplie d'oxigène pur. La digestion est aussi troublée: car, pour son accomplissement normal, il faut que l'estomac, qui a reçu l'aliment, devienne le siege d'un certain degré de congestion sanguine, qui, chez les individus, anémiques, ne peut plus avoir lieu. A mesure que le sang se refait, ces différens phénomènes morbides disparaissent."

At the 769th page of volume the second he adds: "L'anémie des centres nerveux se produit sous l'influence des mêmes causes que celles que nous avons assignées en général à toute anémie (tome I). Elle peut être bornée au cerveau, ou coincider, avec un état d'anémie de tout le corps. Elle s'observe, soit dans les maladies chroniques, soit dans certaines maladies aiguës où les symptômes semblaient annoncer un état d'irritation du cerveau, et où l'on n'est pas peu étonné de trouver, au contraire, cet orgaine d'une pâleur remarquable. Nous avons déjà eu occasion de nous arrêter sur ces faits, que nous nous bornerons ici à rappeler."

But the most interesting remark of this writer occurs at page 46 of volume the first. Speaking of the sinking state generally, M. Andral confirms, in almost the same terms, the remark which I had made so long before, in regard to sinking from loss of blood, and other causes, that the lungs are "comme ils le

sont chez les animaux dont les nerfs pneumogastriques ont été coupés, ou chez les individus frappés d' apoplexie."*

4. *Of Exhaustion with Delirium.*

It has already been seen that delirium is a frequent result of exhaustion from loss of blood. It occurred in the cases detailed pp. 19—21. The following case, with which I have been favoured by Dr. Abercrombie, is, as that gentleman observes, in all its circumstances one of considerable interest.

" A lady aged about 35, after delivery of her fifth or sixth child, recovered favourably for a fortnight, when she became affected with pain and deep-seated hardness in the right side of the pelvis, painful to the touch, and accompanied by a considerable degree of fever. After repeated topical bleeding, and various other remedies, the febrile state subsided, the swelling lost its tenderness, and it seemed to be gradually diminishing in size; but its progress was slow; and, after three or four weeks from the time of its appearance, she was still confined to bed, and was suffering a good deal of uneasiness: her pulse was now calm, but she was considerably reduced in strength. At this time she was one day alarmed and agitated by some family occurrence of a trifling nature, and im-

* See p. 50 of this volume; and the " Medical Essays;" p. 56.

mediately began to talk wildly and incoherently; and, after a restless night, she was found next day in the highest state of excitement, talking incessantly, screaming, and struggling, with a wild expression of countenance, and a small rapid pulse. She was now treated by leeches to the temples, cold applications to the head, purgatives, &c. but with little or no benefit; and, on visiting her next day, I found her sitting up in bed, with a look of extreme wildness, both her hands in constant motion; she was talking incessantly, loudly, and wildly, and I learnt that she had not ceased talking in this manner for one instant for the last twelve hours. Her pulse was rapid and feeble, and her countenance expressive of exhaustion. This was a state which I had repeatedly seen fatal under various modes of treatment, and I certainly expected no good of the case. But in consultation with a highly respectable medical friend who had charge of it, I proposed to try a treatment purely stimulant. A full glass of white wine was accordingly given, and ordered to be repeated every hour. On visiting her at the end of the fourth hour, I found her composed and rational; her pulse 90 and of good strength; and from this time there was no return of the symptoms. The tumour in the right side increased in size, suppurated, was opened, and healed favourably; and she is now in perfect health.

Dr. Abercrombie adds, "I have several times seen a state resembling mania take place after large bleeding

in inflammatory diseases, and subside gradually as the patients recovered strength. The most remarkable of these, that I recollect at present, were after pneumonia, and acute rheumatism. Many years ago, I saw a man who was seized with bleeding from the nose to such an extent, that, at last, it became necessary to arrest it by pieces of sponge carried up from the fauces. Next day he was without complaint except great weakness; on the third day he became highly maniacal: pulse generally from 90 to 100, and soft. After various treatment with little benefit, for eight or ten days, an emetic was given; he vomited smartly, and, in doing so, the plugs were forced out of his nose. Very soon after this he fell asleep, and, after a long sleep, awoke quite rational, and continued so."

I am persuaded that loss of blood is by far the most frequent and influential source of delirium or mania occurring in the puerperal state. It would lead me into too long a discussion to treat of this point in this place. Besides, I purpose making it the subject of distinct consideration at some future period. Meantime, I would beg to refer my readers to my work on some Diseases of Females, pp. 251—256; and to Dr. Gooch's recent Account of some Diseases peculiar to Women, chap. ii. and especially pages 144, 145.

5. *Of Exhaustion with Coma.*

It has already been stated that exhaustion from loss of blood is apt to induce a state of coma. This effect is most obvious in the case of infants and children.* But it is not confined to this early period of life. Next to childhood, the feeble state of old age appears most prone to this form of exhaustion, as I think youth and vigour are to delirium. Coma occurred, however, in its most marked form in the interesting case given pp. 45—49.

Dr. Abercrombie observes, "In the last stage of diseases of exhaustion, patients frequently fall into a state resembling coma, a considerable time before death, and while the pulse can still be felt distinctly; and I have many times seen children lie for a day or two in this kind of stupor, and recover under the use of wine and nourishment. It is often scarcely to be distinguished from the coma which accompanies diseases of the brain. It attacks them after some continuance of exhausting diseases, such as tedious and neglected diarrhœa; and the patients lie in a state of insensibility; the pupils dilated, the eyes open and insensible, the face pale, and the pulse feeble. It may continue for a day or two, and terminate favourably, or it may be fatal. This affection appears to corre-

* See Appendix.

spond with the apoplexia ex inanitione of the older writers. It differs from syncope, in coming on gradually, and in continuing a considerable time, perhaps a day or two; and it is not, like syncope, induced by sudden and temporary causes, but by causes of gradual exhaustion going on for a considerable time it differs from mere exhaustion, in the complete abolition of sense and motion, while the pulse can be felt distinctly, and is, in some cases, of tolerable strength. I have seen in adults the same affection, though it is perhaps more uncommon than in children. A man, considerably advanced in life, in consequence of a neglected diarrhœa, fell into a state closely resembling coma; his face pale and collapsed, but his pulse of tolerable strength. An elderly lady, from the same cause, had loss of memory and squinting. Both these cases recovered by wine and opiates: in the former, blistering on the neck was also employed. Richter states that amaurosis has been produced by hæmorrhage, cholera, and tedious diarrhœa; and he mentions particularly a dropsical woman who became blind when the fluid was evacuated from her abdomen by tapping.

"On this interesting subject I shall at present only add the following remarkable illustration from an affection of hearing. A gentleman, about thirty years of age, came to Edinburgh from a distance, for advice in regard to an obscure affection, referred chiefly to the stomach, which had reduced him to a

state of extreme weakness and emaciation. As the debility had advanced, he had become considerably deaf; and, when I saw him, he was affected in the following manner. 'He was very deaf while sitting erect or standing; but, when he lay horizontally with his head very low, he heard perfectly. If, when standing, he stooped forward, so as to produce flushing of his face, his hearing was perfect; and, upon raising himself again into the erect posture, he continued to hear distinctly as long as the flushing continued; as this went off, the deafness returned.

"Upon the whole, it seems highly probable that a certain balance of the circulation of the brain is necessary for the healthy condition of its functions; that they are equally impeded by the interruption which takes place in apoplexy, and the diminished impulse which occurs in these opposite conditions. What, indeed, is syncope but an abolition of sense and motion? It is preceded by giddiness, tinnitus aurium, and impaired vision; and is accompanied by blindness, dilated pupil, perfect insensibility, and not unfrequently passes into convulsion. It differs then from apoplexy, chiefly or entirely in the state of the general circulation, the symptoms accompanying the two affections being remarkably similar, and the effect upon the sensorial functions almost entirely the same."*

* On Diseases of the Brain, pp. 310—312.

For the following most interesting case of coma, and finally of sudden sinking, from exhaustion, I am greatly indebted to a medical friend.

"An opulent farmer, nearly 60 years of age, tall and well-formed, of active habits in the early part of life, mostly of the sanguineous temperament, and of the bilious diathesis, was affected with hereditary gout at an early period of life, and had continued to be a martyr to that disease. He had, for many years, been occasionally affected with internal spasm in the cardiac region, attended with urgent sickness and giddiness, that form of complaint, namely, which is commonly called gouty spasm of the stomach. The biliary system was sometimes so much deranged as to give rise to jaundice. He had more than once been attacked with pneumonia, which was always sufficiently active to require one or more general bleedings.

"About five months before the fatal event which I have to describe, he was seized with apoplectic symptoms. He was saved from death by prompt treatment by bleeding and purgatives. From this time, however, his health became wholly unsettled, and his frame evidently enfeebled. In the beginning of summer he was occasionally affected with sub-acute gout, both in the upper and lower limbs, and also with lumbago. Cramps and jactitations prevailed much in these attacks; the depression of his spirits

was extreme; the tone of the nervous system was in every way reduced.

"After exposure in an open carriage, on one fine day with the wind in the east, he was suddenly attacked with a severe pain in the abdomen, chiefly in the right hypochondrium and towards the stomach, the respiration being at the same time exceedingly painful and laboured. His medical attendant viewed the diseases as acute hepatitis, and bled him profusely from the arm, and with immediate relief, which was rendered more complete by the free action of purgative medicines. There was a slight recurrence of the symptoms in the course of forty-eight hours, and large depletion from the vessels was again practised, so that at the end of three days, nearly seventy ounces of blood had been abstracted by means of the lancet, cupping, and leeches.

"When the reporter of this case first saw this patient, the state of the vital powers was seriously depressed. The patient appeared bloodless, and cadaverously pale. The superficial veins everywhere had the look of being quite empty. The tongue was pale, and coated with brown fur, the saliva was abundant, but extremely viscid; the eyes were glassy, the pupils dilated, the sight imperfect, the voice was very feeble; there was much subsultus tendinum; the senses occasionally wandered, there was a lethargic state without any refreshing sleep; on the contrary, there was much restlessness; the

jactitation of the limbs was considerable, the respiration, when the eyes were closed, was noisy, and distinguished in a great degree by puffing, as a smoker puffs out the smoke from his pipe. The pulse ranged from 100 to 120, and was truly the irritable pulse: it was throbbing, and also attended with a jerk. His pulse, in health, was known to be about 66.

"The treatment had in every way been strictly antiphlogostic; the diet being confined to gruel, barley water, and tea. At this juncture it appeared imperative to change the regimen. The patient had a frequent disposition to faint, and actually appeared to be sinking into death. Cordial nourishment, as gruel and brandy, eggs, wine, beef-tea, &c. were administered with caution. The former fluids had been rejected from the stomach, but the cordials just mentioned, were retained. Cordial medicines were also given; in the first instance a volatile saline draught with cordial confection; and due attention was paid to the bowels.

"The powers of the patient were soon revived, and in a few days acquired a remarkable degree of improvement. After a short time, he was enabled to take airings in a carriage daily, but still there was no promising convalescence. The pulse never fell below 90, and continued bounding; there was an unceasing lethargy, and in sleep the respiration was

attended with the puffing. Subsultus tendinum continued to prevail.

"At the end of a month from the time of the first attack, the unfortunate patient became suddenly seized with stertorous breathing, while in the act of taking some nourishment. The muscles of the face were distorted, all the superficial vessels of the head and neck were instantly distended, and in less than two minutes death closed the scene.

"No examination of the body was permitted."

6. *Of Exhaustion with Amaurosis.*

It sometimes happens that the most prominent symptom in exhaustion from loss of blood, and indeed from some other causes, is a state of amaurosis. Upon this point I cannot do better than insert the following interesting observations of Mr. Travers.*

"A loss of balance in the sanguiferous system, occasioning an undue determination of blood to the head, often exists, distinct from general plethora, and is aggravated by loss of blood. The following case is an example:

"A young medical man came to me one morning from the country in extreme anxiety, with an earnest solicitation that I would instantly apply a ligature to his carotid artery. This gentleman, aged 25, was of

* Synopsis of the Diseases of the Eye, Ed. 1. pp. 158—160.

short stature, and constitutionally healthy. His pupils were large, and his countenance was suffused, and bore the appearance of preternatural determination of blood to the head. He had been the subject of two attacks of inflammation; one in April, the other in October of the same year; during which he lost upwards of an hundred ounces of blood. He had now a constant heavy pain in the head, chiefly over the coronal suture, and in the direction of the sinuses, with tinnitus of the left ear. After stooping, the giddiness was extreme, and a golden-coloured spot, edged with black, appeared floating before the eye. He had been troubled with muscæ in excess, for a year and a half past; he had now fire sparks flashing before the sight, and saw a pulse in the choroid synchronous with that of the wrist. When looking at near objects he was not troubled with muscæ, but they were always numerous, in proportion as the object was remote. He did not complain of much dimness. His complaints were not relieved by topical blood-letting. He recovered gradually, but perfectly, under a regulated diet, and a course of the blue pill with saline aperients.

"The amaurosis, from depletion, is sometimes mistaken for its opposite, viz. that from plethoric congestion; this is owing to the coincidence of a dilated and immoveable pupil, muscæ, and a deep-seated pain in the head, with occasional vertigo; and its occurrence in a corpulent habit. It succeeds

somewhat abruptly to uterine floodings, and large and sudden depletion for acute diseases. The pain is not confined to the region of the orbit, though it affects chiefly, if not exclusively, the same side of the head; it is that peculiar nervous pain to which women are subject after uterine hæmorrhage, attended with a sense of defined pressure, as of an iron finger on the brain; and sometimes a distressing jarring noise like that of a mill or threshing-floor, or the rattling of the shingles as a heavy wave of the sea recedes. It is perhaps connected with an imperfect injection of the medullary substance. By a cautious use of tonics it is relieved; by whatever lowers or stimulates, whether diet or medicine, it is decidedly aggravated. The vision in this form of amaurosis is further enfeebled by the loss of as much blood as flows from two or three leech-bites. This is not imaginary; I have seen distinctly marked cases of it, in which large and copious venesection was still urged as the only resource of art. This I consider to be a fatal mistake."

Amaurosis occurred in the very interesting case given, p. 45; and it had been here noticed by Richter; see p. 58.

CHAPTER IV.

OF THE EFFECTS OF FURTHER LOSS OF BLOOD IN CASES OF EXHAUSTION.

1. *Of the substitution of Syncope for Reaction.*

The symptoms of exhaustion with reaction have, I am persuaded, frequently been mistaken for those of inflammation or other disease of the head or of the heart. Under this impression recourse has frequently been had to the further detraction of blood by the lancet. And the effect of this practice is such as greatly to impose upon the inexperienced,—for all the symptoms are perhaps greatly relieved.

It was some time before I could fully comprehend the nature of this fact. I had satisfied myself that, in certain cases the symptoms were those of loss of blood; and yet it appeared no less certain that those very symptoms were relieved by the lancet. At length I discovered, by a careful observation, that the symptoms which were relieved were those of reaction; and that the mode of relief was by the substitution of syncope; that the relief endured as long as the state of faintishness continued, but returned as this

state gave way to the allaying and reaction of the vital powers.

Another circumstance equally interesting and curious was, that within certain limits, the remedy which relieved for a time, eventually only added to the severity of the malady, for this was apt to return after a certain period, in a still more aggravated form. It is natural, indeed, to suppose, that, unless there was a tendency to the failure of the vital powers, the reaction of the system and the painful circumstances attending it, would be greater after a third or fourth loss of blood, than after a first or second; indeed there are seldom the symptoms of reaction after one flow of blood, however great or profuse; it is the repetition or protraction of the cause which, as I have already observed, is essential to produce this effect.

It is observable too that in cases of exhaustion with reaction, syncope is very soon produced by the further loss of blood. This fact is of importance, because it may be regarded as a sign of the state of exhaustion, when this is observed by the reaction of the system, and as a warning voice against the further and inconsiderate use of the lancet.

Mrs. ———, aged 21, and of a rather feeble constitution, was confined of her first child; the bowels had been constipated, and were moved several times by a dose of castor oil, but becoming again confined she became much indisposed on the fifth day, with flushing of the countenance, noise in the ears as

of a rushing wind or the explosion of crackers, flashes of light on lying down, beating of the carotids, &c. the pulse being 120 in a minute. Fourteen ounces of blood were taken from the arm, which induced deliquium with relief to the symptoms.—About seven hours afterwards the noises in the head had returned and the pulse was 120; twelve ounces of blood were again drawn and the patient again fainted, and was again relieved. Eight ounces of blood were taken the next day. On the succeeding day the medical attendant was called early in the morning; there had been little sleep, but much lowness for several hours, the patient then complained of violent beating in the head; the pulse was 120. A teacupful of blood was taken which induced faintishness and abated the beating of the head.—By noon, she was again flushed and the beating had returned in an aggravated degree.—From this period the patient was bled no more; but recovered under the influence of aperient and anodyne remedies.

Mrs. ——, aged 35, was confined in June, 1811; the expulsion of the placenta was followed by much hæmorrhagy, which induced great exhaustion. On the tenth day she was seized with severe shivering, heat, throbbing pain of the head, and intolerance of light and sound; ten ounces of blood were taken from the arm, about 10 o'clock A. M., which induced faintishness and relief. At 7 o'clock in the evening, the pain of the head was as severe as ever;

twelve ounces of blood were taken from the arm; this was followed by such dreadful faintness and gasping breathing, as even to lead to the apprehension of dissolution; on recovering, the pain and intolerance of light and of sound returned as before. This patient became affected with all the symptoms of exhaustion with reaction, but gradually recovered without further blood-letting.

It gives me great pleasure to add, in this place, the further testimony of Mr. Brodie to the facts and principles which I have published in relation to this interesting question.

"In taking a view of the various satisfactory reasons which may be urged in favour of a particular plan of treatment in cases of concussion of the brain, we must not overlook the circumstance that this treatment may be carried too far: and we must endeavour to avoid the error which I have known some surgeons fall into, of resorting to a too free use of the lancet. At first when the reaction of the heart has taken place, it may be right that the patient should lose a considerable quantity of blood, so as completely to subdue the force of the circulation. Afterwards, for the most part, it is only an occasional blood-letting that is required, and that to a moderate extent. It has appeared to me that this mode of proceeding has usually done more, both towards relieving the present symptoms, and preventing subsequent inflammation, than a more active system of

depletion; and where very large quantities of blood have been already taken away, if inflammation should show itself, our resources are comparatively limited, and we are not able to meet it with that energy and vigour which the circumstances of the case require.

"Where bleeding has been carried to a great extent, symptoms frequently occur which in reality arise from the loss of blood, but which a superficial observer will be led to attribute to the injury itself, and concerning which indeed it is sometimes difficult, even for the most experienced surgeon to pronounce in the first instance to which of these two causes they are to be referred. Repeated copious blood-letting is of itself adequate to produce a hardness of the pulse, which we shall in vain endeavour to subdue by persevering in the same system of treatment. In many individuals it will produce headache and confusion of mind, not very different from what the injury itself had previously occasioned. These things may be observed especially in young females who are disposed to hysteria, and whom I have often known to suffer from a continued aggravation of such symptoms as I have described, while the system of depletion has been continued, recovering immediately on the use of the lancet being laid aside, and on their being allowed to take solid nourishment, with occasional doses of carbonate of ammonia. Dr. Marshall Hall has published in the thirteenth volume of the Medico-Chirurgical Transactions, some excel-

lent practical observations on the effects of copious blood-letting, many of which are applicable to the cases mentioned above."*

2. *Of Sinking, or more Sudden Dissolution.*

If the loss of blood be repeated still further, not only syncope, but a state of sinking is induced; the effects of reaction are of course in this case, permanently relieved whilst a different series of phenomena, already fully described, is established. This transition of reaction into sinking may either be spontaneous, as in the case of Mr. ——, detailed in the preceding section, p. 45, or it may be the effect of a last blood-letting, the state of syncope scarcely ceasing, no reaction following, but the total though gradual failure of the vital powers.

When the last bleeding has been considerable, it has, in some cases, been followed by the most dreadful gaspings and other convulsive motions, and death. It should be observed that between the most gradual sinking and the most sudden dissolution, as the effects of blood-letting, there is every intermediate shade, with the phenomena of which it is of the utmost importance to be acquainted. These varied phenomena may, I think, be collected from the observations which have been made in this and the preceding sec-

* Medico-Chirurgical Transactions, Vol. xiv. pp. 381, 382.

tions. They are further illustrated by the following cases which exemplify the fatal effects of loss of blood, as supervening more and less gradually upon the use of the lancet.

Mrs. ——, aged 30, had been affected with what appeared to be a slight attack of influenza; she was seized with rigor and soon afterwards the pains of labour came on and issued in delivery in about fifteen hours, at nine o'clock A. M.; this was followed by much fever, the countenance being flushed, the pulse frequent, and the breathing difficult with incessant cough; these symptoms increased towards evening and in the night, and about forty ounces of blood were drawn from the arm at two blood-lettings, and the next morning twelve leeches were applied to the chest, with great relief. In the evening a blister was applied.—The night was passed more comfortably; she dozed a little and was cheerful, and continued relieved in the morning. As a preventive against a relapse, however, three teacupsful of blood were taken. The patient became faint during the flow of the blood, sank from that time, and never again rallied; she became extremely feeble, and could scarcely articulate, and from being cheerful the day before, was now impressed with the conviction of approaching dissolution, and expressed herself as unable to recover from the last blood-letting. During this day, Saturday, and during the two succeeding days

there was a state of extreme exhaustion,—and still a sense of load at the chest, and pain of the side.

On the succeeding Tuesday the countenance was observed sometimes to flush to a deep scarlet, and then to become quite pallid, and a profuse perspiration frequently ran down the face; the pulse was extremely frequent, and the pain severe on coughing; there was no delirium though she awoke hurried from sleeps which she described as 'just like death.' During the four following days there was little obvious change; distressing faintings usually came on about two or three o'clock, P. M. On the Sunday, she became drowsy, and evidently more sinking; this state continued to increase, and she died in the evening of the following day.

The last blood-letting, in the case just given, was obviously though rather gradually fatal. In the present case, the fatal event supervened immediately on the use of the lancet. Mrs. —— was of a pale and sallow complexion and weakly constitution. Six days before her confinement of her first child, she was awoke in the night by severe pain of the head confined to one spot. This pain continued several hours, when Mrs. —— applied to her medical man; she was completely relieved by losing sixteen ounces of blood, followed by purgative medicine, and she continued well.—Mrs. ——'s labour occurred on the 1st of September, 1817, and was rather tedious, but natural, and she had no com-

plaint until the second day, when she experienced a second attack of pain in the head, but less violent than the previous one. She was seen six hours after this attack; she then complained of pain and beating of the head, about the anterior part of the right parietal bone; the skin was hot, and the pulse frequent and strong. Sixteen ounces of blood were taken from the arm, leeches were ordered to be applied to the temples, and an enema and purgative medicine were prescribed. In three hours' time Mrs. —— was again visited, and it was deemed necessary to abstract more blood:—six or eight ounces were therefore taken; faintishness was induced, and the symptoms were abated.

On the succeeding morning, September the 4th, the symptoms still remained the same; the surface was hot; the bowels had been purged and the evacuations were natural. The saline mixture was ordered. At noon the symptoms remaining as before, the purgative medicine was repeated and a blister was applied.—In the evening, the evacuation of the bowels was satisfactory, and the pain of the head was not severe, but there was much beating and a rushing noise; and there was restlessness, and a teasing, irritative cough. A draught with thirty drops of the tinctura opii was administered.

On the morning of September the 5th, Mrs. —— expressed herself as being much better from having enjoyed comfortable sleep. The surface was still

hot, and the head still affected as before. In the evening, there was a degree of tenderness in the region of the uterus. She dreaded the idea of being bled, from the faintishness she had before experienced from it, and said it would certainly kill her. On the morning of the 6th, the pain in the region of the uterus was relieved, the head was affected as before, the window was kept open for want of air. In the evening Mrs. —— complained of being faint and low. A mixture with camphor and sulphuric æther was prescribed.

On the 7th, the irritative cough again occurred; the pulse was frequent, from 120 to 130; and the other symptoms remained unabated. A physician was consulted. Sixteen ounces of blood were directed to be taken from the arm; a grain of calomel was given every three hours, and the effervescing medicine was ordered.

On the morning of the 8th, Mrs. —— appeared to be relieved in every respect; the heat of the surface and the pain of the head were diminished; the blood presented the buffy coat. It was thought proper, however, to abstract more blood. Four teacupsful were taken; the most dreadful fainting followed, with gasping, open mouth, a convulsive action of the diaphragm, and in an hour or two death closed the scene.

The following case forwarded to me by a medical

friend is not, I think, unworthy of a niche in this little volume.

"A gentleman nearly seventy years of age, the subject of frequent gouty paroxysms, whose constitution was broken down, and who was of a pallid complexion, was suddenly seized with severe pain in the side, hot skin, quick full pulse, and difficulty in breathing. A physician was consulted, who recommended the abstraction of six ounces of blood. The arm was tied up accordingly, the patient being in bed; before two ounces were taken away his pulse sunk, and heavy perspiration came on, with faintness. The patient was placed horizontally in bed, and it was some length of time before his medical attendant deemed it prudent to leave the house.

"The blood taken away, manifested the usual character of inflammation, but the pain in the side was not removed. On the following morning he was again visited by his physician, who finding that the pain and other symptoms detailed were not relieved, directed the bleeding to be repeated to six ounces; this was again attempted, but before one ounce escaped, he became so alarmingly faint, that he fell back in the bed, the circulation being suspended for a length of time, and his dissolution expected to take place. Stimuli of every description which could at the moment be brought forward, were resorted to; after a considerable lapse of time, the heart's

action was feebly renewed, but its power was never again restored; and the pain in his side was not relieved. From this time he progressively sank, and in a short time expired.

CHAPTER V.

ON THE INFLUENCE OF VARIOUS CIRCUMSTANCES ON THE EFFECTS OF LOSS OF BLOOD.

The question of the influence of various circumstances in opposing or inducing the phenomena of exhaustion, in cases of loss of blood, is especially reserved for the second part of this work. I shall therefore make but a few very cursory remarks upon this point in this place.

"The first and principal circumstance which modifies the effects of loss of blood, is that which relates to the strength of the patient. Cæteris paribus, the degree of reaction is proportionate to the degree of strength. In infancy, in declining years, and in the feeble in constitution, there is defective reaction after loss of blood, the phenomena of which have been already detailed; the state of syncope is a state of danger; and a second or a third blood-letting is borne with difficulty. In youth, and in the vigorous and robust, on the contrary, the reaction is strong, and especially marked after repeated venæsection.

In the strong, the state of sinking is ever preceded by that of great reaction, unless indeed the strength

be overwhelmed by the degree or early repetition of the evacuation; in the feeble it steals on insidiously and gradually, unmarked by reaction of the system.

The other circumstances which exert an influence on the effects of loss of blood, are certain states of disorder or disease. And I must in this place particularly remark, that the state of intestinal irritation is particularly apt to lead to those effects of blood-letting which I have described as exhaustion; while that of inflammation seems to protect the system from the effects of loss of blood;—in the former case throbbing is soon induced, unless, indeed, it be prevented by a state more nearly allied to syncope; in the latter, blood-letting is followed by little of reaction until the state of inflammation be subdued, and the system be freely exposed to the uncontroled influence of loss of blood; in the former there is danger from full depletion; in the latter, this measure is providentially not less safe than necessary.

The patient whose case is detailed, page 45, would certainly not have fallen a sacrifice to the loss of one hundred and twenty ounces of blood only, had there been inflammation, and especially inflammation of a serous membrane. Indeed one of the most important remarks which I have to make, and which will lead to one of the most important improvements in surgery, is that we are not to treat the patient im-

mediately after an accident, or an operation, as one affected with inflammation.

Inflammation may, nay, in the course of events will, often supervene; but before this event takes place, the case is to be treated as different from inflammation. Blood-letting is not well borne. It may, if unwarily practised, prove fatal even. Whereas it is the remedy and the only remedy for inflammation.

The phenomena of reaction seem readily to assimilate with the constitutional effects of intestinal irritation, as is distinctly apparent in some of the cases given in the last section; they are, on the contrary, to a certain degree incompatible with those of inflammation; so that, during the existence of acute and active inflammation, the symptoms of exhaustion are seldom observed; but they are very apt to display themselves immediately on the active state of inflammation being subdued; whereas exhaustion and intestinal irritation appear to co-operate in inducing a state of reaction in the system.

In all cases, we are only to expect the phenomena of reaction when a certain quantity of blood has been lost: one blood-letting, although large, and even a continued drain, if not considerable, will not induce exhaustion; the powers of the system are sufficiently great to recruit and to restrain its actions. But exhaustion is sooner induced under circumstances of intestinal irritation, and less so under those of inflammation, than in health; and reaction is the conse-

quence, unless the strength of the patient be low, and then the reaction is defective, or even gives way to a state of positive sinking.

There are seldom the symptoms of reaction after one flow of blood, however great or profuse; it is the repetition or protraction of the cause, which, as I have already observed, is essential to produce this effect.

Each successive blood-letting, is of course attended with increased risk. There is considerable danger where the reaction is strong; still greater when it is feeble. A large blood-letting in such cases may be followed by sudden death. There is greater danger when fainting has been several times induced, and when there is the least tendency to 'want air.'

CHAPTER VI.

ON THE EFFECTS OF LOSS OF BLOOD ON THE INTERNAL ORGANS.

We are altogether in want of a series of observations on the effects of loss of blood on the internal organs.

There is, I think, reason to suppose that a state of exhaustion from loss of blood, may lead to effusion into the ventricles of the brain; and a case published by the late Dr. Denman sufficiently proves that such a state of exhaustion is no protection against an attack of sanguineous apoplexy.

This patient had suffered from hæmorrhagy from a fungous growth from the uterus, which many attempts were made to restrain by ligature during the long interval of time between 1802 and 1809. Dr. Denman concludes this interesting case thus:—

"In February, and in May, 1809, two fruitless attempts were made to pass the ligature. Mr. Croft and myself then agreed to fill a small pair of denticulated forceps, not unlike those used in lithotomy, firmly on the stem, with the intention of occasioning the whole to decay, and of destroying, if it were

possible, the regenerative power. But while we are preparing for this, the patient, after passing the day without any usual complaint, went to bed in good spirits, but was found the next morning in a state of insensibility, with stertor. In this state she remained about twenty-four hours, and then expired. Leave was given to inspect the body, which indeed she had often expressed a wish might be done.

"The head was the first part examined. Nothing particular was observed about the membranes or surface of the brain; but in the ventricles were found about four ounces of blood, separated into coagular and serum. This extravasation was clearly the immediate cause of her death, little as it might have been expected, on account of the daily profuse discharge, to which she had for so many years been subject. It had often been remarked, that, although this patient was become much paler than she had formerly been, she was not comparatively thin in her person; and many who visited her, could hardly be convinced that she laboured under any dangerous disease."*

There is an interesting case which illustrates the fact of a tendency to congestion of the brain, in circumstances of exhaustion from loss of blood, in Mr. Hey's work upon puerperal fever. There had been

* Transactions of a Society for the Improvement of Medical and Surgical Knowledge, Vol. III. page 315.

hæmorrhagy after delivery, and the patient had been twice bled to seven ounces, for abdominal tenderness. On the morning of the third day it was repeated. She had passed the night without any pain, notwithstanding which she had slept but little. Pulse at 110, and very strong. No more stools: clyster repeated.

The author proceeds, "Having augured favourably of this case from the gradual and complete cessation of pain, it was with no less surprise than regret, that, in the evening, I found an entire new train of symptoms. The patient having been affected throughout the day with an irresistible propensity to sleep, from which she got no refreshment, awoke in the evening with pain in her head, accompanied with giddiness and ringing at the ears. Her face was flushed; her pulse at 132 and strong. She had had three loose stools, and had parted with a large quantity of urine. Some leeches were ordered to be applied to the temples; but finding, on a second visit, that they had not been procured, I took three ounces of blood from the temporal artery. The saline draughts were directed to be made without decoct. cinchonæ, and a blister to be applied to the nape of the neck. Just before the bleeding the pulse was at 120, after it at 112.

"24th. I found the patient sitting up in bed to take some refreshment. She had slept several hours in the night. Her countenance was good. It was

rather singular, that the left side of the head, from which the blood had been taken, was easy, but the opposite side painful. The crassamentum, as before was extremely firm. Pulse 126. I took three ounces of blood from the temporal artery of the right side, and the evacuation greatly diminished the pain.

"In the evening she experienced a seizure somewhat similar to that of the preceding day. Having been visited by several friends, who had inconsiderately talked and read a good deal to her, she was suddenly affected with a sense of great confusion and noise in the head, accompanied with much heat and flushing of the face. Pulse 140. In consequence of the relief before experienced, she was very desirous to lose some more blood from the temples, and therefore, though the pulse appeared less strong, I took an ounce and a half from the temporal artery.

"The case having become more alarming from this relapse, a consultation was requested; and a physician who had attended several of these melancholy cases with me, was called in; my father also visited the patient with us. The pulse had come down to 120, and was evidently fuller since the bleeding. The crassamentum was as firm as before. It was agreed, that the saline draughts should be continued, that a blister should be applied to the head, and temples and forehead be frequently bathed with cold vinegar and water.

"25th, Eight, A. M. She had had no sleep in the night, but the head was rather more composed, and she was free from heat. Pulse 116. Some indications of a paralytic affection were now apparent. She faltered in her speech, and her tongue, when put out, was drawn to one side. At noon the pulse got up to 140, she took little notice, and, though she sometimes spoke coherently, an answer to any question could scarcely be obtained from her; her mind also appeared much agitated.

"At four, P. M. the physician met us: it was agreed that a little wine whey should be given frequently, and the following medicine was prescribed;

R. Spt. æther. comp. gutt. xxx.
Spt. ammon. comp. gutt. x.
Aq. puræ ℥iss. M.
fiat haustus tertiâ quâque horâ sumendus.

A draught with fifteen drops of tinct. opii was also directed to be taken at bed-time.

"26th. The night had again been passed almost without sleep; but the head was free from pain, confusion, and the sense of ringing. Pulse 116.

"Two, P. M. After three hours, comfortable sleep, the head was not so well. The bowels were open, and the stools natural. Pulse 120.

"27th. I was not able to see the patient myself

on this day, and I neglected to minute any account of its occurrences.

"28th. She had had no sleep in the night, and was very restless, with some degree of delirium. We found her incessantly talking, but could procure no answer from her to any question that was proposed. She refused all medicine. Pulse 120.

"In the course of the day the abdomen became tumid from flatus confined in the bowels; the tumefaction was unattended by pain or soreness, and entirely subsided as soon as evacuations were procured by an injection.

"Ten, P. M. She was in all respects worse. Her urine came away involuntarily; she had some rattling in her breathing, and appeared to be sinking. Pulse 132. Thirty drops of spt. æther sulph. were ordered to be given now and then as a grateful cordial.

"29th. We were agreeably surprised to find our patient much better. During the night she had been able to retain her urine, and had made a large quantity with proper intervals. She was quite sensible, and more composed; and had regained the power of putting out her tongue, which before she had lost. The pulse was at 106, and the tongue continued clean. Ordered to take at regular intervals a draught of infus. rosæ made with decoct. cinchonæ, and to have occasionally a little Madeira wine.

These favourable symptoms did not long continue.

In the evening the pulse had got up to 120, and the heat had increased.

"From this time the patient became gradually weaker, her pulse was accelerated more and more, and her urine was again discharged involuntarily. She lived two days in a state of great anxiety, and increasing restlessness, and died on Sunday night the first of July."

It is impossible to imagine a more interesting and instructive train of events. Nothing but a careful examination is wanting to make it complete as an illustration of the effects of the extreme loss of blood upon the brain, lungs, and other organs of the body.

I am indebted for the cursory sketch which follows, to my friend Dr. Tweedie. "Mrs. ——, aged about 27, of spare habit, and the mother of two children, was frequently affected, during her last pregnancy, with uneasiness about her head, very often amounting to pain. There was great irritability of mind, so that trifling matters annoyed her.

"During the latter months of her pregnancy there was frequent profuse flooding. This, in spite of rest and antiphlogistic measures, went on, and ended in premature labour.

"She had a slow recovery; and when first permitted to sit out of bed, she suddenly lost the power of speech, and, on her husband coming to her, she was found to be affected with paralysis of the right side.

She was moderately treated, and the paralysis was slowly removed.

"She was then removed to Brighton, but during the journey she one morning started up suddenly in bed, in a state of insanity."

The following case, for which I am indebted to Mr. Hammond, of Brixton, is one of the most interesting kind, both in the mode of its accession and removal.

"Mrs. ——, a delicate thin woman, was confined on the 20th Dec. 1827. The labour was natural, but, after the expulsion of the placenta, she lost about three pints of blood. This produced faintness, which continued for nearly an hour, after which she recovered. The night was passed free from any pain or disturbance, but she was watchful, and could get no sleep. On the following day, however, she was cheerful, the lochia natural, the milk beginning to be secreted, the pulse 110, the bowels not relieved. She complained of a slight headache, but attached no importance to it, as in her usual health she was more or less troubled with it.

"On the 22d Mrs. —— took half an ounce of castor oil, which opened the bowels but once; but this produced fainting, which continued for some time. The headache continued, but was not increased in violence. She repeated the castor oil at 8 o'clock in the evening.

"On the 23d, the bowels were not relieved; but they were freely on the 24th, when considerable faintness followed, and the headache became more severe. Twelve leeches were applied to the temples; the lochia and milk flowed abundantly. In the evening the headache was found to be much relieved; she took some mild support, and expressed herself as considerably better. The pulse as yesterday.

"On the 25th it was reported that Mrs. —— had passed a more comfortable night: but the headache had returned with increased severity; she was bled to twenty-four ounces, which produced slight faintishness, but the headache was not relieved. The bowels were open; the pulse 120, sharp and wiry; the secretions went on well. At one o'clock headache was as acute as in the early part of the morning. The bleeding was repeated and carried to deliquium; she lost about 20 ounces, and then became strongly convulsed. The blood was cupped and sizy. The tinctura opii was given in camphor mixture. At half after six o'clock a physician was called in consultation. The headache was relieved, but she appeared much exhausted; the countenance was blanched to an ivory whiteness; the pulse 115, and soft. The infusum digitalis with liquor ammoniæ acetatis was directed to be given every four hours.

"On the 26th Mrs. —— was found to have had a tolerable night, having slept four hours, but she again complained of headache. Twelve leeches

were applied to the temples, and afforded relief. The bowels were regularly attended to; the lochia were less in quantity; the milk abundant; the pulse 115; the tongue moist.

"On the 27th, 28th, and 29th Mrs. —— was better in every respect.

"On the 30th the headache returned, and she was restless. Six leeches were applied to the temples In other respects she was the same.

"On the 31st, at 10, A. M., it was reported that she had passed a tranquil night, and was in every respect better. At 6, P. M. the medical attendant was called suddenly to her, and found her in a state of extreme depression, the right arm paralyzed, the leg partially so, the speech much altered, and the deglutition difficult; the countenance was blanched, and the pulse feeble. Eight leeches were ordered to be applied to the side of the neck, and a blister to the nape, with pills of camphor, and camphor draughts.

"On January the first, the paralytic affection was better, though the arm remained still powerless. Mrs. —— complained of much exhaustion. In the evening it was found that there was considerable diarrhœa, which produced faintness; the pulse was feeble; the skin natural. The mistura cretæ with tinctura opii was given with mild support.

"On the 2d of January, the diarrhœa was still very urgent; the countenance was sunken and

anxious; the pulse extremely weak, indeed scarcely perceptible. Broth with isinglass and rice, and mild support, were directed to be given frequently. The paralysis was subsiding. The lochia had nearly disappeared; the milk was abundant.

"On the 3d of January, the diarrhœa was beginning to decline, but the patient remained in a very exhausted state. The headache was nearly gone; the pulse was stronger; and the general appearance improved. Nourishment had been taken freely.

"From this time Mrs. —— continued to improve, the symptoms gradually subsiding; and at the end of the month she became quite convalescent; and she has continued in good health."

Mr. Travers mentions a case of pneumonia, in which a stroke of palsy, fatal the same evening, took place in the act of blood-letting.* It is to be regretted that it is not mentioned what quantity of blood had flowed before this event occurred; but as it is given to illustrate the effects of loss of blood, it is to be presumed that it was considerable.

Paralysis has occurred in a state of exhaustion from other causes, as undue lactation, and in various circumstances of debility, as in cases of disorder of the general health, with sallowness and pallor, and a loaded tongue and breath. Of the former case Dr. Davis mentions an instance in his correspondence

* On Constitutional Irritations, p. 501

with Dr. Musgrave. Of the latter, I witnessed an example in a very near relative. Amaurosis is not unfrequent in similar circumstances.

Effusion into the ventricles is doubtless a frequent effect of the extreme state of vascular exhaustion. An example of this kind has already been given p. 49. The experiments of Dr. Seeds and Dr. Kellie confirm the same fact.

After the brain, it becomes necessary to examine the condition of the lungs under the influence of excessive loss of blood. I have already compared this state to that observed in the experiment of dividing the eighth pair of nerves, or otherwise subtracting the nervous energy, p. 52. Still there is a difference: instead of hepatization with destruction of the texture of the lungs, there is œdema with a clogged condition of the bronchia.

It is by the stethoscope, indeed, that the very first symptoms of sinking from loss of blood will be discovered, although a very early one is that rattle which I have already described as being audible without the immediate or mediate application of the ear.

The bronchia first become clogged, the lungs become œdematous and the arterialization of the blood is defective.

In two patients, who died of hæmorrhagy, examined by Dr. Hodgkin, the lungs were found decidedly œdematous; in one, there was effusion into both cavities of the pleura and pericardium; in the other

there were adhesions. In one the head was examined, and no morbid appearances found. A similar illustration of the effects of exhaustion from loss of blood, was detailed to me some years ago by Mr. Jowett, of Nottingham.

The state of flatulency, sometimes almost amounting to tympanitis, and the fœtid evacuations of the intestines, sufficiently denote the morbid condition of this internal organ.

There is also in extreme cases of exhaustion, a general tendency to serous effusion, both into the internal cavities and into the cellular membrane. This effect of the loss of blood has been very long remarked by medical writers.

As I have carefully avoided, in this work, the statement of any circumstances which I did not think amply substantiated by well-observed facts, I shall leave this part of my subject to be elucidated by future observation.

I still have it in view to investigate the organic effects, and especially the remedies, of loss of blood by a series of experiments.

CHAPTER VII.

OF THE TREATMENT OF THE VARIOUS EFFECTS OF LOSS OF BLOOD.

The treatment of the effects of loss of blood must be resolved into that which is general or constitutional, and that which is local; and it must vary according to the peculiar state or stage of these effects. Syncope, reaction, and sinking, each, require their appropriate treatment.

The constitutional treatment must be stimulant in syncope, sedative and soothing in the state of reaction, and restorative in that of sinking. The local treatment must vary with the organ chiefly affected, and with the mode in which it is affected.

When syncope assumes a dangerous form, the principal remedies are, attention to the posture of the patient, stimulants, and chiefly brandy, and the transfusion of blood.

The effect of posture is not, even now fully known. It would be easy to allow the patient to lie over the edge of the bed, the head low upon the floor, and the feet greatly raised. In this manner such

pressure would be restored to the encephalon as would in many cases support life, until, other remedies being administered, the patient might be placed out of immediate danger.

I need not, in this place, notice the importance of a regulated mode of giving brandy and nourishment. I think it is frequently given in such quantities as actually to induce sickness, and its own rejection from the stomach, and so as to frustrate the object of the physician completely. The effects should be carefully watched. The physician ought not, of course, in such a case, to leave the patient for a moment.

The next remedy is transfusion. Unfortunately it has too frequently happened that the proper period of adopting this measure has been allowed to pass by. Not only the vascular system is exhausted, but, after a time, the functions of the nervous system have begun to fail. It might be a question, therefore, whether galvanism might not be usefully conjoined with transfusion.

It is an important point to determine how large a quantity of blood the system will bear to receive under various circumstances of exhaustion. Too much may overwhelm. Too little may be inadequate to the accomplishment of the object in view.

It is also an important question whether the operation should be done at once, or at twice, or thrice, and with what intervals. As the system cannot

bear a sudden reduction of the quantity of blood, so it may not be enabled to bear its too sudden restoration.

It is almost needless to add, that a due attention must be constantly paid to assist the arterialization of the blood, by the admission of fresh air; and to sustain the animal heat by proper clothing, and especially warm applications to the feet.

If there should be convulsions, delirium, or coma, it may be necessary to apply a sinapism to the nape of the neck; and in the two former cases, some mild sedative, as the tinctura hyoscyami, may be of advantage.

In the case of excessive reaction, the remedies appear to be, first, extreme quiet of the body and of mind; then, the mildest sedatives, especially the hyosciamis; thirdly, the mildest nutriments; and lastly, and above all, time.

The pain and throbbings in the head, the intolerance of noises, the general susceptibility to disturbance, the palpitations of the heart, alike demand the utmost quiet, to which everything soothing in the manner and treatment must be added. The tinctura hyoscyami is, I think, the kindliest anodyne and sedative in these cases. The cause and other circumstances of the case, point out the necessity for

mild nutriment, to which perhaps the minutest quantities of brandy may be added.

It may be necessary to subdue the throbbing action of the head, by local blood-letting even; and it is most remarkable how small a quantity of blood being taken, will relieve. An interesting example of this kind is given at page 83. Two or three leeches are frequently quite sufficient.

But the most unequivocal remedy is a cold spirituous lotion applied all over the head, by means of a cap consisting of one fold of stocking.

In exhaustion with delirium, the tinctura hyoscyami should be conjoined, in full doses, with the other remedies. The morbid susceptibility, not only of the brain, but of the heart, is greatly assuaged by this remedy.

In cases of exhaustion with sinking, stimulants must be administered abundantly. Cataplasms of mustard may be applied to the nape of the neck, and to the feet. It is difficult to imagine what would be the effect of the transfusion of blood; I have no doubt that galvanism would prolong life; and I should think the two remedies might be conjoined with advantage.

In all cases of exhaustion the functions of the bowels suffer. Constipation and flatulency are the usual consequences. These are best relieved by the warm water enema, which must, however, of course,

be administered with due precaution, to prevent further exhaustion.

It is interesting to observe the blunted sensibilities in syncope and in sinking, and to compare them with the morbidly acute sensibilities of the state of reaction. Sinapisms to rouse, and the tinctura hyoscyami to lull them, are, in their respective places, remedies of the greatest value.

Sinapisms may tend to save or prolong life, in the sinking state, on the principle of exciting inflammation. For it will be seen shortly, that during a state of inflammation, the system is far less susceptible of the effects of loss of blood generally, than in health.

After the due administration of blood-letting, there are three other remedies, the use and abuse of which still offer matter of interesting inquiry to the practical physician, both in their relation to the morbid effects of loss of blood, and to other diseases. These are, purgative medicines, brandy, and opium.

Aperients must be given, yet guardedly given, in cases of debility or exhaustion. The bowels become disordered, and must be gently relieved; but the more active operation of an aperient would add to the exhaustion.

The powers must be recruited and sustained, and for this purpose brandy must be administered, yet cautiously. Too much stimulus would hurry the

action of the heart. The proper criterion for the use of brandy is, on the contrary, that it should allay the morbidly increased action of this organ.

Opium, if properly given, allays the morbid sensibilities and actions of the system. But if it be administered in an undue dose, it is apt, I am persuaded, to lower the powers of life, by directly subduing the energies of the nervous system, or rather, by inducing an impaired condition of the respiration. The undue action of opium resembles, in fact, the case of substracted nervous energy by the division of the eighth pair of nerves, with the superadded influence of impaired respiratory movements.

I may pursue the inquiry into the action, use, and abuse of these three important remedies at some future period.

APPENDICES TO PART THE FIRST.

APPENDIX I.

ON THE SIMILARITY BETWEEN LOSS OF BLOOD, AND THE BLOODLESSNESS OF CHLOROSIS.

There is a remarkable similarity between the effects of loss of blood, and the state of bloodlessness which obtains in chlorosis. The general symptoms; —the tendency to affections of the head resembling arachnitis, and to affections of the heart resembling organic affections of this organ;—the condition of the general surface, and of the capillary and larger circulations;—the proneness to œdema and serous effusions generally, are, indeed, identical in both these conditions.

These two affections not only agree in the many particulars enumerated, but also in two others of great interest; first, in their tendency, in their last stages, to induce effusion into the cavities of the

brain, pleura, pericardium, and peritonæum; and secondly, in their involving a danger of issuing in the state of sinking, or even of sudden death.

From both these circumstances it is plain that the capillary and the general circulation are alike in a very analogous condition in these two morbid states; and from both these circumstances the morbid anatomy is found to be very similar.

The differences which do exist between these two morbid states arise from the different modes of their accession, loss of blood being a simple event, while the bloodlessness of chlorosis is the gradual effect of a previous state of complicated disorder. In the former, as there are none of the peculiar appearances of the tongue and internal mouth observed in chlorosis, so there is an absence of some internal changes, especially of the liver, which, as I have observed elsewhere,* is very apt to become affected with simple enlargement in cases of protracted disorder of the general health.

I have met with two cases of chlorosis in which the whole of these observations were fully exemplified,—the only cases of this affection which have been fatal within the scope of my observation. In the first, the patient sank exhausted into a state of coma and death. In the second, death occurred, suddenly, the patient after being confined to bed a

* Commentaries, &c. p. 45.

few days, and immediately after being in better spirits than usual, having sat up for a quarter of an hour, became faint, gasped, and expired.

The former of these cases was one of pure chlorosis. The latter, chlorosis with a degree of the icterode complexion. Of the former case no examination was permitted. In the latter, the following morbid appearances were observed; There was some effusion into the ventricles of the brain, the pericardium, and the left cavity of the pleura, the right being obliterated by adhesion; the lungs were gorged with serum; the heart was large; the liver much enlarged: the hand was of the colour of ivory; there was plenty of adipose substance; the ancles were a little œdematous.

Some years ago a patient, after excessive bleeding, was doing well, but got up in bed to empty the bladder,—sank down, and suddenly expired. The event in this example of chlorosis was precisely similar. It has already been stated, that, in exhaustion from excessive loss of blood, the patient is apt to sink into coma; such a case is parallel with that of the case of chlorosis first mentioned.

In a word, there is, in exhaustion, loss of blood without previous disorder or disease, while in chlorosis, there is bloodlessness as an effect of previous disorder, and frequently as a complication

of organic disease. In both there is the same tendency to œdema from failure of the capillary circulation, and to sinking or sudden dissolution from failure of the circulation in the larger vessels.

APPENDIX II.

ON A HYDRENCEPHALOID AFFECTION OF INFANTS ARISING FROM EXHAUSTION.

I HAVE watched, with peculiar care, many cases of a morbid affection incident to infancy, which generally arises from circumstances of exhaustion, but resembles, in many of its symptoms, the earlier and especially the later stages of hydrencephalus. As this affection has not been noticed by practical writers as it deserves, I think the following brief account of it cannot prove uninteresting to the profession.

I first gave a cursory sketch of this morbid affection in a little volume of "Medical Essay" published in 1835, but now out of print. It has since been briefly noticed by Dr. Abercrombie in his valuable "Researches on Diseases of the Brain and Spinal Chord," published in 1828. The present essay was read to the Medico-Chirurgical Society, on the ninth of December, 1828. Lastly, Dr. Gooch has treated of this affection in his excellent "Account of some Diseases peculiar to Women," just published. These are all the notices I have hitherto seen of this singular and interesting disorder.

The diseases of children best understood, are those which arise from irritation, and principally irritation in the stomach and bowels, and the irritation of teething, and inflammation. But there is another source of disorder in infancy, less frequent perhaps in its operation, but not less important in its consequence, and far less understood by medical men, in exhaustion. This exhaustion has its origin in early infancy, chiefly in diarrhœa or catharsis; in the later periods of infancy, in the loss of blood, with or without the relaxed or evacuated condition of the bowels.

The state of diarrhœa has generally depended upon improper food. It has very frequently succeeded to weaning, or to other changes in the diet. The catharsis has followed the administration of an aperient medicine, which, at such a moment of disorder of the stomach and bowels, is apt to act excessively. The exhaustion from loss of blood generally follows the inappropriate or undue application of leeches or use the lancet.

I may observe, indeed, in this place, that of the whole number of fatal cases of disease in infancy, a great proportion occur from this inappropriate or undue application of exhausting remedies. This observation may have a salutary effect in checking the ardour of many young practitioners, who are apt to think that if they have only bled, and purged, and given calomel enough, they have done their duty;

when, in fact, in subduing a former, they have excited a new disease, which they have not understood, and which has led to the fatal result.

This question, and that of the effects of exhaustion in infants and children, open a new field for investigation. Almost all our works on infantile diseases are silent on the subject; and yet without an accurate knowledge of it, I regard it as totally impossible that we should be prepared to watch and treat the morbid affections of this young and tender age. The subject must be taken up and investigated anew. All the affections which may arise from exhaustion, must be accurately observed, distinguished from similar affections arising from other causes, and traced back to their origin, and forward in relation to their remedies. In this manner some hydrencephaloid, convulsive, and even croupy affections will be viewed in a new aspect; and we shall be preserved from some painful dilemmas into which we should assuredly fall without this knowledge of the effects of exhaustion.

But in this essay I purpose to confine my observations to one of the forms of disorder which arise from this cause,—the hydrencephaloid. It may be divided into two stages, the first that of irritability, the second that of torpor; in the former there appears to be a feeble attempt at reaction, in the latter the nervous powers appear to be more prostrate. These

two stages resemble, in many of their symptoms, the first and second stages of hydrencephalus respectively.

This morbid affection has, as I have stated, usually been first induced by some change in the diet, by which the stomach has been loaded or disordered, and the bowels perhaps affected with diarrhœa; and this latter state has frequently been exasperated by the untimely administration of an aperient medicine. The infant becomes irritable, restless, and feverish; the face flushed, the surface hot, the pulse frequent; there is an undue sensitiveness of the nerves of feeling, and the little patient starts on being touched, or from any sudden noise; there are sighing, moaning during the sleep, and screaming; the bowels are flatulent and loose, and the evacuations are mucous and disordered.

If, through an erroneous notion as to the nature of this affection, nourishments and cordials be not given; or if the diarrhœa continue, either spontaneously, or from the administration of medicine, the exhaustion which ensues is apt to lead to a very different train of symptoms. The countenance becomes pale, and the cheeks cool or cold; the eye-lids are half-closed, the eyes are unfixed, and unattracted by any object placed before them, the pupils unmoved on the approach of light; the breathing, from being quick, becomes irregular and affected by sighs; the voice

becomes husky, and there is sometimes a husky teasing cough; and, eventually, if the strength of the little patient continue to decline, there is crepitus or rattling in the breathing; the evacuations are usually green; the feet are apt to be cold.

A similar train of symptoms occurs in other cases, in which the strength of the little patient has been subdued, and the vascular system exhausted by the abstraction of blood. In both cases, leeches are sometimes again applied to subdue this new form of disease, under the erroneous notion of a primary cerebral affection. This measure infallibly plunges the little patient into imminent, if not irretrievable danger.

Sometimes the sinking state goes on in spite of every appropriate remedy.

Stimuli, if efficacious, reduce the frequency of the pulse, and restore the wonted warmth, colour, expression, and smiles to the countenance.

The condition of the cheeks, in regard to colour and warmth, may be considered as the pulse of very young infants, indicating the degree of remaining power, or of exhaustion. In the present case especially, there is no symptom so important, so distinctive. It is from the condition of the cheeks, in conjunction with a due consideration of the history, that the diagnosis of this morbid state, and the indications of the appropriate remedies are chiefly to be deduced. The general surface, and especially the

hands and feet, also afford important sources of information as to the condition of the nervous or vital powers. Next to these, the degree of frequency of the pulse, and the character of the breathing, are points of the greatest importance; during the stage of irritability the breathing is quick; during that of torpor, it is slower, irregular, suspirious, and finally crepitous; the pulse changes in its beat, from being full becoming smaller, but retaining, perhaps, its former frequency.

We should be especially upon our guard not to mistake the stupor or coma, into which the state of irritability is apt to subside, for the natural sleep, and for an indication of returning health. The pallor and coldness of the cheeks, the half-closed eye-lid, and the irregular breathing, will sufficiently distinguish the two cases. It is equally important to dintinguish this state from a hydrencephaloid affection arising from derangement of the alimentary canal, and from the coma of hydrencephalus itself. This is to be done chiefly by observing the condition of the countenance, and by tracing the history and cause of the affection.

The following remarks are copied from my "Medical Essays." They present a sketch of a morbid affection, of which I have since the period of their publication, seen sufficient to enable me to describe it more distinctly.

"The state of exhaustion is very apt to be in-

duced in early infancy, and as the reaction is feeble at this period of life, the case soon assumes the character of sinking. I have frequently been consulted when the original disease has been subdued, perhaps, and the chief complaint of the little sufferers was a state of exhaustion which a truce from remedies and medicines, and a proper supply of nourishment and perhaps stimulus have removed.

"This state of things is often mistaken for inflammation of the brain, or hydrencephalus. And it may be difficult to state the grounds for a just diagnosis between the two affections. It will, however, be of great assistance to be fully aware of the nature and character of exhaustion, and to conjoin with this knowledge a due retrospect of the history of the case, and a due consideration of the effects of the various remedies which may have been employed.

"The state of exhaustion in infants is little marked by the symptoms of reaction. At first there are great restlessness and irritability of temper, whilst the countenance is pale and expressive of great anxiety, and there is great frequency of the pulse; afterwards the temper and restlessness appear subdued, there are some dozing and other false and deceptive appearances of amendment, but the pulse is still more frequent, the face pale and sunk, and the cheeks and extremities are cold: the voice is apt to be husky, and attended with a husky, hacking, and distressing cough."

"When a child has been rather long ill, when active remedies have been employed, when the form of the disease has perhaps changed in some degree, and paleness of the cheeks is attended with irritability and restlessness, we should carefully consider whether the symptoms may not be those of exhaustion. I am persuaded that by relinquishing all lowering remedies, and adopting a cordial and soothing plan of treatment, I have seen some children recover who would soon have sunk under the continuance of remedies calculated to subdue a supposed state of inflammation.

In these cases, the idea that the original disease, and the remedies, had worn out the little patient, and led to a state of exhaustion, had apparently never occurred to the practitioner. It is impossible to do justice to this subject in a short section of a short essay; but I am satisfied that the hints here offered, will, if carefully considered and cautiously acted upon, be of great assistance to the young physician in his treatment of some of the diseases of infants."*

Dr. Abercrombie observes,—"in the last stage of diseases of exhaustion, patients frequently fall into a state resembling coma, a considerable time before death, and while the pulse can still be felt distinctly; I have many times seen children lie for a day or two in this kind of stupor, and recover under the

* Pp. 72—76.

use of wine and nourishment. It is often scarcely to be distinguished from the coma which accompanies diseases of the brain. It attacks them after some continuance of exhausting diseases, such as tedious or neglected diarrhœa; and the patients lie in a state of insensibility, the pupils dilated, the eyes open and insensible, the face pale, and the pulse feeble. It may continue for a day or two and terminate favourably, or it may prove fatal. This affection seems to correspond with the apoplexia ex inanitione of the older writers. It differs from syncope in coming on gradually, and in continuing a considerable time, perhaps a day or two; and it is not, like syncope, induced by sudden and temporary causes, but by causes of gradual exhaustion going on for a considerable time. It differs from mere exhaustion, in the complete abolition of sense and motion, while the pulse can be felt distinctly, and is, in some cases, of tolerable strength. I have seen in adults the same affection, though it is perhaps more uncommon than in children."* In a letter which I had the honour to receive from Dr. Abercrombie, that gentleman observes, "the state of infants which I have referred to, is a state of pure coma, scarcely distinguishable, at first sight, from the perfect stupor of the very last stage of hydrocephalus, the child lying with the eyes open, or half open, the pupils

* Researches, &c. pp. 310, 311.

dilated, the face pale. It is difficult to describe distinctly the appearance, but it is one which conveys the expression of coma, rather than of sinking; and I remember the first time I met with the affection, the circumstance which arrested my attention, and led me to suppose the disease was not hydrocephalus, and the state somewhat different from coma, was finding on further inquiry, that it came on after diarrhœa and not with any symptoms indicating an affection of the head. The child recovered under the use of wine and nourishment."*

Dr. Gooch observes,—"I am anxious to call the attention of medical men to a disorder of children which I find invariably attributed to, and treated as, congestion or inflammation of the brain, but which I am convinced often depends on, or is connected with, the opposite state of circulation. It is chiefly indicated by heaviness of head and drowsiness: the age of the little patients whom I have seen in this state has been from a few months to two or three years; they have been rather small of their age, and of delicate health, or they have been exposed to debilitating causes. The physician finds the child lying on its nurse's lap, unable or unwilling to raise its head, half asleep, one moment opening its eyes, and the

* Effects somewhat similar are apt to follow operations on very young children. The reader may consult Mr. Travers' late interesting work upon "Constitutional Irritation," pp. 139—141, published in 1826.

next closing them again with a remarkable expression of languor. The tongue is slightly white, the skin is not hot, at times the nurse remarks that it is colder than natural; in some cases there is at times a slight and transient flush: the bowels I have always seen already disturbed by purgatives, so that I can scarcely say what they are when left to themselves; thus the state which I am describing is marked by heaviness of the head and drowsiness, without any signs of pain, great languor, and a total absence of all active febrile symptoms. The cases which I have seen have been invariably attributed to congestion of the brain, and the remedies employed have been leeches and cold lotions to the head, and purgatives, especially calomel. Under this treatment they have gradually become worse, the languor has increased, the deficiency of heat has become greater and more permanent, the pulse quicker and weaker, and at the end of a few days, or a week, or sometimes longer, the little patients have died with symptoms apparently of exhaustion. In two cases, however, I have seen, during the last few hours, symptoms of oppressed brain, as coma, stertorous breathing, and dilated and motionless pupil."*

But although this morbid affection is scarcely described by former writers, it is, I find, sufficiently familiar to many observing practitioners, on recalling

* Account &c., pp. 357, 358.

to their minds the circumstances of the singular and interesting state of things attending it, and I am indebted to several friends for notices of cases of this kind.

The remedies for this morbid affection, are such as will check the diarrhœa, and afterwards regulate the bowels, and restore and sustain the strength of the little patient. With the first objects it may be necessary to give the tinctura opii, and chalk, and afterwards the pilula hydrargyri, rhubarb, and magnesia; with the second, sal volatile, but especially brandy, and proper nourishment are to be given according to circumstances. But, in this, as in so many cases of infantile disorders, the young milk of of a young and healthy nurse, is the remedy of most importance,—in the absence of which, ass's milk may be tried, but certainly not with the same confident hope of benefit.

Five or ten drops of the sal volatile may be given every three or four hours; and twice or thrice in the interval, five or ten drops of brandy may be given in arrowroot done in water. As the diarrhœa and the appearance of exhaustion subside, these remedies are to be subtracted; the bowels are to be watched and regulated, and the strength is to be continually sustained by the nurse's or ass's milk. The brandy has sometimes appeared to induce pain; sal volatile is then to be substituted for it; a dose of magnesia has also appeared to do good.

For the state of irritability, the warm bath is a remedy of great efficacy. For the coma a small blister or sinapism should be applied to the nape of the neck. A state of exhaustion of the general system, as I have observed elsewhere,* by no means precludes the possibility of real congestion of the brain. It rather implies it. In extreme cases these are not only the symptoms of cerebral congestion during life, but effusion of serum into the ventricles of the brain is found on examination after death.

In every case the extremities are to be kept warm by flannel, and the circulation should be promoted in them by assiduous frictions. It is of the utmost importance carefully to avoid putting the little patient into the erect posture. A free current of air is a restorative of the greatest efficacy.

I proceed to exemplify this description and the appropriate treatment, by adducing several cases. The first I give from the "Medical Essays:"

Case I.—"A little girl aged four months was seized with a bowel complaint; the usual medical attendant prescribed an aperient, which acted too freely. When I saw it on the second or third day of the disorder, the countenance was pale and sunk, and the cheeks cool; it started on being touched; there was a peculiar huskiness of the voice, and the pulse beat from 144 to 150. By giving brandy, the

* Commentaries on Diseases of Females, passim.

pulse was found on the succeeding day reduced to 120. and there was some apparent amendment, although a degree of ruttling in the breathing or on coughing, was now added to the huskiness of the voice. By continuing the brandy the cheeks became warm, and at length somewhat flushed, and the pulse rose to 140. The quantity of brandy was diminished and cautiously regulated, and the pulse very gradually fell to the natural standard.

"In this case the pallidness and coldness of the cheeks, and the state of the voice and breathing, indicated almost a fatal degree of exhaustion; the frequency of the pulse arising from this cause, was reduced by the brandy; but it was afterwards again increased as the effect, not of the exhaustion, but of the stimulus, and the cheeks recovered their warmth, and sometimes even became flushed. In another case precisely similar, the state of sinking continued in spite of every remedy, and the little infant lingered and then expired. I have known such a state of lingering to be continued for several days."

Case II.—On Saturday the 21st of March, I was called to an infant three months old, under the following circumstances. It had been weaned a fortnight; during this period it had been fed with milk and barley water, and once a day with the addition of bread. It remained well until the Thursday before my visit, when it became affected with fever,

restlessness, crying, and moaning in its sleep, and with diarrhœa, passing several undigested and mucous stools. A dose of calomel was given, which induced sickness. A second dose was then administered which in the course of that and the succeeding day, Friday, was followed by sixteen evacuations.

During Friday night, there was much heat, interrupted sleep, and griping pains, followed by offensive evacuations. On the following morning, there was some degree of dozing of coma, the eyes were imperfectly closed, the tunica albuginea alone being visible, and the mouth was open. This inanimate state, attended by coldness of the cheeks, hands and feet, would continue for ten minutes, and then there would be some degree of reaction.

This state of things continued during the whole of Saturday, the dozing assuming the character of more settled coma. I saw the little patient late in the evening. The cheeks were then pale and cold; the eyes were half open, and unfixed, and unexcited by any external object however brilliant, and the pupils were moderately dilated, and unmoved on the approach of light; the pulse was 132: the breathing irregular and sighing; the general surface pale, and the hands and feet cold.

There were thus the usual symptoms of the comatose stage of hydrencephalus. The condition of the countenance, general surface, and extremities, and the his-

tory of the case, however, led me to view it as one of exhaustion, and not of inflammation and effusion within the head. I therefore prescribed five drops of brandy, and three of sal volatile, to be given alternately every hour; and I directed the little patient to be put once in the interval of the two hours, to the breast of a young and healthy nurse.

Under this discipline there was a gradual but not unchequered amendment. The stupor began to alternate with restlessness, and there were frequent startings; more than once the restlessness was so great as to require the use of a warm bath, by which it was greatly relieved, and quiet and sleep induced. The countenance gradually assumed a more natural and animated appearance and expression, with an occasional smile. The bowels were moved four times on the succeeding day, the evacuations being green.

On Monday morning, a little magnesia and rhubarb were given, the other remedies having been and being still continued. The little patient started much less on this day, and slept quietly, and there was no return of restlessness to require the warm bath.

On the succeeding days there was an obvious and progressive amendment. The brandy and sal volatile were gradually abstracted, the breast being continued.

Case III.—I was called a short time ago, to see

a little girl, aged two years and three quarters, who had laboured under an attack of influenza. The affection of the chest had been severe and protracted, and sixteen leeches had been applied, besides the administration of other depletory measures, before it had subsided.

The symptoms of affection of the chest were, however, subdued at last; but the little patient was left extremely exhausted, and in this state a new train of symptoms supervened, not less alarming, and more puzzling, than the first. The child fell into a dozing state, and lay with its eyelids but half closed; it moaned when any attempt was made to rouse it; the eyes were unfixed on any external object, the pupils were dilated, yet partially contractile on the influx of light; the pulse was 140.

On withdrawing into an adjoining room, the medical gentleman whom I had the pleasure of meeting, observed, "hydrencephalus has now supervened, and we must administer calomel." I replied that I took a different view of the case,—that it resembled hydrencephalus indeed, but arose from exhaustion, and that brandy, not calomel, could alone save the little patient's life. I referred to the history of the case for sufficient sources of exhaustion; and to the facts detailed in the preceding part of this paper, for the actual occurrence of such cases in practice.

We administered brandy, directing thirty drops to be given every two hours, with barley-water in the

intervals, and a quarter of a pint of ass's milk twice in the twenty-fours. The bowels were relieved by magnesia and the warm water injection.

This plan of treatment lowered the number of the pulse, and gradually diminished the severity of the other symptoms. Still the eyes were not to be fixed by presenting any bright object before them; the pupils remaining dilated; the tunicæ conjuctivæ became inflamed from exposure, between the partially closed eyelids; and once or twice the fæces were passed involuntarily in bed.

The brandy having occasioned pain in the bowels, an effect which I have several times observed, it was given alternately with the spiritus aromaticus. The rest of the plan was pursued with unexampled assiduity by a most tender mother, who did not once undress or leave her little patient, until she saw it out of all danger. This task was the severer, because, although the symptons which had been detailed subsided gradually and favourably, they were succeeded by an equally severe and sadly protracted aphthous affection.

The first symptom of amendment was a diminished frequency of the pulse; the next a restored susceptibility of the pupils to light; then the eyes became attracted and fixed by external objects, and a smile began to play upon the little patient's countenance; the eyelids closed more and more perfectly during sleep, and the conjunctivæ lost their inflamed, in-

jected appearance; the knees were drawn up, and the posture on the side began to be assumed spontaneously.

I have notes of two other cases of this kind, but they are so precisely similar to those which I have given, that it appears needless to add to the length of this little paper, by relating them in detail. I shall rather adduce the further evidence contained in the following paragraph of a letter written to me by my friend, Mr. Heming, Surgeon, of Kentish Town, than whom I know not a more intelligent and observing practitioner:

"The two little children of whom I spoke to you, became affected with bowel complaint, and the usual medical attendant gave them some aperient medicine. As they continued to get worse, Dr. Blegborough was consulted. I saw them on December the 10th, 1826. The youngest, an infant aged nine months, was suffering with aphthous diarrhœa, was very pale, and much emaciated, and appeared to be dying. It lingered for two or three days with the symptoms of sinking, which you have described, and then expired. The eldest child, a girl aged three years, the principal subject of the short account which I am enabled to give you, had had leeches applied to the temples, and had taken calomel and jalap, and its mother was, at the time I saw it, applying a cold spirituous lotion to the head. Dr. Blegborough had given it as his opinion, that the case was hydrencephalus, and of

course hopeless, and in truth I thought he was right, for the child was completely insensible to sound or light, the eyes were half closed, and affected with strabismus, and the pupil dilated; its head fell from side to side, and the fæces were passed involuntarily; the skin was blanched, and there was great emaciation. I recommended sinapisms to be applied to the feet; and, if the child should become capable of swallowing, which I did not expect, to give it ass's milk, and to omit all medicine.

"When I called on the 12th, I was greatly and agreeably surprised to find this little patient much better. The ass's milk had been taken and seemed to agree. As the bowels were still moved frequently and involuntarily, and as I did not now think the symptoms depended upon effusion into the brain, though I confess I was much puzzled to know to what cause they were to be assigned, I recommended small doses of laudanum to be given until the diarrhœa should be checked. On the 14th, the motions were less frequent, and the little patient was better in every respect. On the 18th, although very pale, the child was still further improved. It was sent into the country, and a few months after, it was perfectly well."

For the following case I am indebted to my intelligent friend Dr. Tweedie:

"In September last, I was requested by a respectable medical practitioner to visit an infant which he

suspected to be dying from effusion into the brain. On reaching the house, I found a little child about four months old, lying in a state of complete coma, from which it could not be roused. On raising the eyelids, the pupils were found natural though the eye was dull. The pulse was rapid and feeble, the breathing frequent, and occasionally interrupted and suspirious, and the bowels were loose, the evacuations consisting chiefly of mucus.

"On inquiring into the previous history, I was informed that the mother having accepted the situation of wet nurse in a family, had placed this child, which was then in perfect health, under the care of another nurse who had just weaned her own child at the age of nine months; that very soon afterwards it began to be sick, and the bowels became relaxed, and as it did not get better, it was removed to the house of a relation, who attempted to rear it by spoon diet. It was soon observed to rally under this change; but the diarrhœa continued in spite of remedies administered with the view of checking it. Ten days afterwards it became again fretful and uneasy, the bowels being still purged; then coma gradually supervened, and it died nine days afterwards, within twelve hours of my visit.

"Permission could not be obtained to examine the body."

It is since this paper was read to the Medico-Chirurgical Society, that I have had the satisfaction

of seeing the recent publication of Dr. Gooch, in which that acute physician has given cases similar to those just detailed. I cannot but be sensible of the flattering manner in which he has alluded to my observations.

As the cases and remarks of Dr. Gooch contain the only additional information upon the present subject which I have found in medical writings, I think it important to add some of them to those which I have already deduced from my own observation, and that of the gentlemen already quoted:

"A little girl, about two years old, small of her age, and very delicate, was taken ill with the symptoms which I have above described. She lay dozing, languid, with a cold skin, and a pulse rather weak, but not much quicker than natural. She had no disposition to take nourishment. Her sister having died only a week before of an illness which began exactly in the same way, and which was treated by leeches and purgatives; and some doubts having been entertained by the medical attendant of the propriety of the treatment, leeches were withheld, but the child not being better at the end of two days, the parents, naturally anxious about their only surviving child consulted another practitioner. The case was immediately decided to be one of cerebral congestion, and three leeches were ordered to be applied to the head. As the nurse was going to apply them, and during the absence of the medical attendants, a friend called in

who had been educated for physic, but had never practised it, and who had great influence with the family: he saw the child, said that the doctors were not sufficiently active, and advised the number of leeches to be doubled. Six, therefore, were applied; they bled copiously; but when the medical attendants assembled in the evening, they found the aspect of the case totally altered, and that for the worse: the child was deadly pale, it had scarcely any pulse, its skin was cold, the pupils were dilated and motionless when light was allowed to fall on them, and when a watch was held to its eyes it seemed not to see; there was no squinting. Did this state of vision depend on the pressure of a fluid effused into the brain since the bleeding, and during this exhausted and feeble state of circulation, or did it depend on the circulation of the brain being too languid to support the sensibility of the retina? It is well known that large losses of blood enfeeble vision. I saw a striking instance of this in a lady who had flooded to death. When I entered the chamber she had no pulse, and she was tossing about in that restless state which is so fatal a sign in these terrific cases. She could still speak, asked whether I was come, (she knew I had been sent for, and said, "Am I in any danger?—How dark the room is!—I can't see." The shutters were open, the blind up, and the light from the window facing the bed fell strong on her face. I had the curiosity to lift the lid, and observe

the state of the eye; the pupil was completely dilated, and perfectly motionless, though the light fell strong on it. Who can doubt that here the insensibility of the retina depended on the deficiency of its circulation? But to return to the little patient. The next day she had vomited her food several times; it was therefore directed that she should take no other nutriment than a desert spoonful of ass's milk every hour, and this was strictly obeyed, and continued for several days. The child wasted, her features grew sharp, and every now and then she looked fretful, and uttered a faint squeaking cry; the eyeballs became sunk in the socket, like those of a corpse that had been dead a month; the skin continued cool, and often cold, and the pulse weak, tremulous, and sometimes scarcely to be felt. Under this regimen, and in this way, she continued to go on for several days. At times she revived a little, so as to induce those who prescribed this treatment to believe confidently that she would recover, and she clearly regained her sight, for if a watch was held up to her she would follow it with her eyes. She lived longer than I expected; a full week, and then died with the symptoms of exhaustion, not with those of oppressed brain. The head was opened by a surgeon accustomed to anatomical examinations, and nothing was found but a little more serum than is usual in the ventricles.

"If the reader has perused the foregoing case at-

tentively, and has reflected on it, he will of course draw his own inferences. I can draw no others than these, that the heaviness of head and drowsiness, which were attributed to congestion in the brain, really depended on a deficiency of nervous energy; that the bleeding and scanty diet aggravated this state, and insured the death of the child; also, that the state of the eye which so speedily followed the loss of blood, and which resembled that occasioned by effusion, did in reality depend on a deficiency in the circulation of the brain, a fact of considerable curiosity and importance.

"I will now relate a case similar in the symptoms, but very different in the treatment and result. I was going out of town one afternoon, last summer, when a gentleman drove up to my door in a coach, and entreated me to go and see his child, which he said had something the matter with its head, and that the medical gentleman of the family was in the house, just going to apply leeches. I went with him immediately, and when I entered the nursery, I found a child, ten months old, lying on its nurse's lap, exactly in the state which I have already described; the same unwillingness to hold its head up, the same drowsiness, languor, absence of heat and all symptoms of fever. The child was not small of its age, and had not been weak, but it had been weaned about two months, since which it had never thriven. The leeches had not been put on. I took the medi-

cal gentleman into another room, related to him the foregoing case, and several similar to it, which had been treated in the same way, and had died in the same way. Then I related to him a similar case, which I had seen in the neighbouring square, which had been treated with ammonia in decoction of bark, and good diet, which had recovered; not slowly, so as to make it doubtful whether the treatment was the cause of the recovery, but so speedily that at the third visit I took my leave. He consented to postpone the leeches, and to pursue the plan which I recommended. We directed the gruel diet to be left off, and no other to be given than ass's milk, of which the child was to take, at least a pint and a half, and at most a quart in the twenty-four hours. Its medicine was ten minims of the aromatic spirit of ammonia in a small draught every four hours. When we met the next day, the appearance of the child proved that our measures had been right; the nurse was walking about the nursery with it upright in her arms. It looked happy and laughing: the same plan was continued another day; the next day it was so well that I took my leave, merely directing the ammonia to be given at longer intervals, and thus gradually withdrawn, the ass's milk to be continued, which kept the bowels sufficiently open, without aperient medicine.

"So inveterate is the dispositon to attribute drowsiness in children to congestion of the brain, and to

treat it so, that I have seen an infant, four months old, half dead from the diarrhœa produced by artificial food, and capable of being saved only by cordials aromatics, and a breast of milk; but because it lay dozing on its nurse's lap, two leeches had been put on the temples, and this by a practitioner of more than average sense and knowledge. I took off the leeches, stopped the bleeding of the bites, and attempted nothing but to restrain the diarrhœa, and get in plenty of nature's nutriment, and as I succeeded in this, the drowsiness went off, and the child revived. If it could have reasoned and spoken it would have told this practitioner how wrong he was; any one, who from long defect in the organs of nutrition, is reduced so that he has neither flesh on his body, nor blood in his veins, well knows what it is to lay down his head and doze away half the day without any congestion or inflammation of his brain. This error, although I have specified it only in a particular complaint of children, may be observed in our notions and treatment of other diseases, and at other periods of life. If a woman has a profuse hæmorrhage after delivery, she will probably have a distressing headache, with throbbing in the head, noises in the ears, a colourless complexion, and a quick, weak, often-thrilling pulse, all which symptoms are greatly increased by any exertion. I have seen this state treated in various ways, by small opiates, gentle aperients, and unstimulating nourishment, with no relief. I

have seen blood taken away from the head, and it has afforded relief for a few hours, but then the head-ache, throbbing, and noises, have returned worse than ever; the truth is, that this is the acute state of what in a minor degree, and in a more chronic form occurs in chlorosis, by which I mean pale-faced amenorrhœa, whether at puberty or in after-life. It may be called acute chlorosis, and like that disease is best cured by steel, given at first in small doses, gradually increased, merely obviating constipation by aloëtic experiments.

"I shall not encumber this paper with a multiplicity of cases, but state that the above are only specimens of a class of which I have seen enough to convince me that they deserve the attention of the profession. If I had any doubt about this, this doubt would be removed by the fact that Dr. Marshall Hall has already recognized them, and described them in a paper which has been read at the Medico-Chirurgical Society. He has therefore anticipated me in announcing them." "The only difference between our experience seems to be this—that he attributes the state which I have been describing to the diarrhœa produced by weaning, or to the application of leeches for some previous complaint. In most of the cases I have seen, however, the child has had no previous illness, and leeches have been applied subsequent to the drowsiness, and as a remedy for it."*

* Pp. 358—367.

In regard to the difference in the experience of Dr. Gooch and myself, I would observe that that of Dr. Abercrombie plainly concurs with mine, and that, in all the cases seen by Dr. Gooch himself, the bowels had already been disturbed by purgatives, so that a source of exhaustion had existed in them. All the cases which I have seen, or heard of, and those of Mr. Heming and of Dr. Tweedie, alike involved a state of exhaustion.

The first stage of the affection which has been described, or that of irritability, may, indeed, depend on a previous disordered conditon of the stomach and bowels; but the state of torpor is obviously the result of exhaustion.

The rest of Dr. Gooch's observations are highly interesting.

Since the preceding pages were written, I have had the satisfaction of having attended a most interesting case of this affection, in conjunction with Dr. James Johnson, and Mr. Balderson, of Poland Street, Oxford Street.

The patient, a little child two years and three quarters old, had taken a purgative medicine intended for an elder child, consisting of eight grains of scammony, and two and a half of calomel, which had acted excessively. It was first seen on August the 30th, affected with sickness and purging, with fever, restlessness, and a frequent small pulse. An

effervescing medicine with the tinctura cardamomi composita was prescribed for the sickness.

In the evening the stomach and bowels were found to be quieted; but there were now flushing, a fuller pulse, and some cough and dyspnœa. Two leeches were directed to be applied to the chest, and the mixture to be continued, omitting the tincture of cardamoms; small doses of the hydrargyri submurias and of ipecacuanha were prescribed.

Aperients, saline, and the vinum antimonii were given, and on September the 2d, two more leeches were applied to the chest.

On the morning of the 3d, a dose of the oleum ricini was prescribed, and a blister was applied to the chest. In the evening Mr. Balderson began to suspect that effusion had taken place into the brain; the skin was hot and dry, the tongue furred, the pupils dilated and incontractile on the approach of light; there was stupor, and the pulse was lower though full. A cold lotion was applied to the head, and the doses of calomel were increased from one fourth to one half of a grain every four hours.

On the 4th, Dr. Johnson saw the little patient with Mr. Balderson, and prescribed nearly similar remedies. There was continued stupor.

On the 5th, the patient was insensible to all around her. I was requested to join Dr. Johnson and Mr. Balderson, in consultation. It really did not appear that sufficient cause of exhaustion existed to account

for the symptoms upon this principle, so that I concurred in the propriety of the measure already adopted, and of the application of two leeches to the temples.

On the 6th, there was too obviously danger of sinking; the cheeks and hands were cold, and the pulse extremely feeble; and I could no longer doubt that the symptoms were induced, not by encephalic effusion, but by exhaustion of the general system. Yet there were dozing, unwillingness to move, and other symptoms of hydrencephalus. There was, however, none of the contracted brow of hydrencephalus, no grating of the teeth, no screaming, no convulsive affection. Thirty drops of brandy were now given in ass's milk every four hours.

The amendment was so obvious, from this change of plan, that the brandy and ass's milk were directed, to be given more frequently at our next visit,—indeed every hour.

Under this discipline our little patient very gradually recovered her sensibility, warmth, and natural disposition, and all the symptoms threatening effusion vanished, together with the restlessness and unwillingness to move.

This case is peculiarly instructive. It teaches us to watch the hydrencephaloid affections of young children, and to suspect exhaustion even when but little blood has been drawn, if the case were merely bronchial, or not really inflammatory. The sad

effects of the application of the two last leeches, contrasted with those of brandy and nourishment, were too striking not to be at once obvious to all. It is also highly important to remember, that one over dose of a cathartic medicine may induce the state of exhaustion with its irritability or its coma.

APPENDIX III.

OF EXHAUSTION ARISING FROM OTHER SOURCES BESIDES LOSS OF BLOOD.

I SHOULD have inserted in this place an account of exhaustion as it arises from other causes than loss of blood, chiefly undue lactation, leucorrhœa, hæmorrhoids, &c. had I not already published my observations on this interesting subject in another work,* to the third and fourth chapters of Part III. of which, I must beg to refer my readers.

It will be readily conceived that hypercatharsis and diarrhœa may induce the symptoms of exhaustion in adults as well as in children. In some cases of great susceptibility to exhaustion, this event is very remarkable, and occurs when from the degree and measure of its cause it could scarcely have been suspected.

* Commentaries on some Diseases of Females.

APPENDIX IV.

OF THE EXHAUSTION ARISING FROM ABSTINENCE.

A FURTHER illustration of the principles detailed in the preceding pages, is afforded by the phenomena of exhaustion arising from abstinence. It would be foreign to the objects of this work to notice this subject except in the most cursory manner. The reader may consult the well known details of the sufferings of Captain Blythe, Captain Franklin, and the crew of the Mèduse, and may perhaps turn for a moment to "The Prisoners of Chillon."

One of the best accounts of the effects of abstinence, is that of a fatal case of this nature by the late Dr. Willan.* It is defective for want of the morbid appearances after death. In this case, great imbecility of mind was replaced by continued raving, and this by sullenness.

An illustration of the effects of starvation, on a larger scale, is presented to us in Dr. P. M. Latham's interesting account of the epidemic at the Milbank Penitentiary. In the extreme stage of weakness in these cases, the head frequently became affected with

* Miscellaneous Works, edited by Dr. Ashby Smith, 1821, p. 437.

pain, vertigo, delirium, convulsions, apoplexy, mania. There was early fainting from bloodletting. On examination after death, increased vascularity was observed in the brain, with effusion between its membranes and into its ventricles. In a word, there were the usual appearances in cases of exhaustion.

I must conclude this subject by the following brief but interesting extract from M. Andral.*

"Au moment où j'écris ces lignes, je lis dans un Journal de médecine un fait qui confirme trop pleinement d'autres faits que j'ai cités ailleurs, pour que je ne le rapporte pas ici. Ce fait me paraît très-bien faire ressortir jusqu'à quel point, en privant le cerveau de ses excitans accoutumés, on peut produire précisément les mêmes effets que ceux auxquels on donnerait lieu en augmentant la quantité de ces excitans.

"Un homme très-adonné à l'ivrognerie, fut jeté en prison pour cause de vol, et réduit tout-à-coup au régime du pain et de l'eau. Dès les premières semaines de ce nouveau genre de vie, on observe du trouble dans les facultés intellectuelles du prisonnier; son embonpoint et ses forces déclinent, sa figure pâlit et exprime l'abattement: il passe les nuits dans l'insomnie; plus tard, il survient un délire, qui, d'abord tranquille, devient ensuite de plus en plus furieux; il croit voir des figures horribles qui le jettent dans

* Anatomie Pathologique, Tom. ii. p. 769.

des angoisses continuelles ; il pousse des cris perçans. Le docteur Hausbrandt, appelé à examiner le malade, apprend quelles étaient ses habitudes avant son entrée en prison, et soupçonne que l'entière abstinence des liqueurs alcooliques est la cause de son dépérissement et de sa manie. En conséquence, il prescrit l'administration deux fois par jour d'une petite quantité d'eau-de-vie ; les accidens cérébraux ne tardent pas pas à se dissiper, l'embonpoint et les forces reviennent ensuite peu-à-peu, le malade recouvre enfin sa première santé, et la conserve pendant tout le temps de sa détention."

APPENDIX V.

OF THE STATE OF SINKING.

Of the state of sinking, little is to be found in medical writings, and it is, I think, seldom understood in practice, in its earliest stages. Yet it is of the utmost importance to distinguish this state, both on account of the prognosis and treatment.

Amongst the first effects of the sinking state, is frequently the subsidence of some painful symptom, as delirium, cough, or even pain itself, into a state of ease and perhaps of dozing. This event is continually mistaken by the patient and his friends for a favourable alleviation of the disease; the physician himself even, may leave his patient in hope, may raise the hopes of relatives, and may even propose to postpone his succeeding visit, under this false impression, when the patient is dozing perhaps to awake no more, or only to a state of obvious but irremediable sinking. This point has been treated of expressly by Sir Henry Halford, in a paper, not duly estimated by the profession, in the sixth volume of the Transactions of the College of Physicians, page 398, and entitled, "On the necessity of caution in the estimation of symptoms in the last stages of some diseases."

The fatal event is occasionally still more sudden, perhaps following immediately upon some sudden exertion or effort.

In this case, as in those of intestinal irritation and loss of blood, there are, when life is protracted, local affections of particular organs, peculiar to itself. The head becomes affected with delirium, or with dozing or slight coma, and there is a half-closed eyelid, restlessness, and moaning; and there is a tendency to effusion into the brain. There is frequently, as a first sign of sinking, a slight crepitus or rattle heard in the breathing, perhaps with a restless cough, or dyspnœa requiring the erect position, and the lungs become affected with œdema, or disorganized as if by inflammation. The pulse is frequent and feeble. The nose and extremities are apt to be cold and livid. The bowels become distended from an excessive evolution of flatus.

The whole of this matter is little understood. Having made it an object of investigation for some time, however, I can speak with confidence of the statements which I have made. As I can, in this place, only give a sketch of the subject, I will refer my readers to such works as contain observations bearing upon it. Mr. John Hunter has written a chapter, in his work on Inflammation, "on Dissolution," which contains many interesting remarks upon the sinking state. I have already quoted a paper by Sir Henry Halford; that physician has also published

another paper, in the fourth volume of the same work, page 316, "On the Climacteric Disease," which is, merely the sinking state of old age. Laennec has some scattered but interesting remarks upon a condition of the lungs, which he denominates in one place "peripneumonie des vieillards," and in another, "peripneumonie des agonisans," and which I recognize to be an affection of the lungs induced during the sinking state. The same observation may be made in regard to some cases of œdema of the lungs. On the present subject the reader may further consult the first volume of the last edition of the celebrated work of this author, pages 97, 284, 351, 481, &c. I can only insert here, a passage from page 284, "Mais de même que l'on observe quelquefois des taches violettes trés-étendues sur les parties postérieures du corps un ou deux jours avant la mort, chez les malades dont les forces sont trés-abattues, et particulièrement dans fiévres graves, de même aussi l'engorgement sanguin ou séreux des parties postérieures des poumons commence souvent quelques heures avant la mort. La crainte de tourmenter inutilement des moribonds m'a empêché de vérifier habituellement ce fait ; mais je l'ai rencontré presque chaque fois que je l'ai cherché. Un rale *sous-crepitant* et muqueux dans les parties inférieurs du dose et à la racine des poumons, accompagne presque constamment l'agonie et le râle trachéal. Ainsi l'oppression que l'on observe chez la plupart

des mourans, lors même que les organes respiratoires ont été parfaitement intacts pendant tout le temps de la maladie, s'explique par le même fait."

There are also some remarks not irrelevant to this subject in the "Clinique Medicale," and in the "Anatomie Pathologique," of M. Andral.

It is plain from these observations that the mere observations of the morbid anatomy, unconnected with that of the symptoms, not only of the disease, but also of the final sinking state, must have led to innumerable errors. The morbid appearances are frequently not the effects of the disease, but of the state of sinking, if that has been protracted; but in what work are these distinguished from each other.

The sinking state obviously differs with its various causes. In the case of sinking from exhaustion, there appears to be a failure of the powers of the whole nervous and secretory systems simultaneously, manifested by its effects on the functions of the brain, heart, lungs, and intestinal canal. When the state of sinking occurs from oppression of the brain, the mechanism of respiration and the functions of the lungs are first and chiefly affected; when on the contrary, sinking arises from a clogged state of the bronchia and of the air cells, there is a manifestly defective arterialization of the blood; and lastly, when sinking takes place in certain affections of the stomach or bowels, as gastritis, enteritis, dysen-

tery, &c. there is great and often sudden failure of the circulation, indicated by an extremely small pulse, and of the animal heat, with a cessation of the pain —events which have frequently led to the erroneous idea of gangrene. These differences in the state of sinking, as well as that state itself, require to be still further traced; the investigation will doubtless lead to many interesting observations in pathology.

It does not appear probable that this state, or disease, as Mr. Hunter terms it, will admit of remedy. I would merely suggest that there is, in some cases of sinking, an obvious analogy to the state induced in animals by the division of the eighth pair of nerves, or the destruction of a part of the spinal marrow, as observed by Dr. Philip,* and that it is probable that the life might be protracted by means of galvanism.

Still it is chiefly with the view to the prognosis that the study of this subject becomes important. And I would particularly notice, in relation to this point, the crepitous rattle of which I have already spoken. From the moment this peculiar symptom is observed, it may, as far as our present means extend, be regarded as of fatal omen. Let us be particularly on our guard against mistaking a state of sinking, for one of amendment. And let us not be taken

* On the Vital Functions, third edition, Chap. vii, and the Philosophical Transactions, for 1827.

by surprise by those still more sudden terminations of the case of sinking, which occasionally occur from effort or exertion.

Several other symptoms besides the crepitus heard in the breathing, are of sad, not to say fatal import. These are a state of inflammation of the conjunctiva, arising, I believe, from the eyes being for a long time only imperfectly closed; great and irregular frequency, and a feebly vibrating character of the pulse; dozing; sighing in the breathing; difficult digestion; a tympanitic tumidity of the bowels; retention of the urine; and involuntary evacuations.

The sinking state is often early denoted by altered secretions, especially fœtid evacuations from the bowels; and by an ungovernable frequent pulse.

Mr. Travers has given a very interesting account of the state of sinking in burns:—

"The complaint of pain in the fatal cases is remarkably disproportionate to the mischief, or at least, it disappears early; and it is a favourable sign, where the continuance of it seems to demand the use of opiates; the early subsidence of complaint, unwillingness to be disturbed, apathy approaching to stupor, as if the scale of sensibility had shrunk below the point of pain, is invariably a fatal symptom. Continued shivering is an ill omen. The failure of the pulse and consequent coldness of the extremities, with a livid hue of the transparent skin of the cheeks

and lips from congestion in the capillaries, drowsiness, with occasional muscular catchings, are sure prognostics of death. The disposition to coma is characteristic, and invariably occurs in a marked degree, even if no opium be given. The respiration is light, scarcely audible, until the pulmonary circulation failing from the diminished power of the heart, congestion takes place in the capillaries of the lungs; but this does not happen until long after the same state has pervaded the system. Finally, laborious breathing and stertor ensue, and the patient expires in an apoplectic coma, with or without convulsions."*

The state of sinking is, in effect, a new disease, supervening upon, perhaps occasioned by, a previous one, or induced, by agents which exhaust the system more directly. It occurs sooner than is suspected, and may be divided into two stages; the concealed, and the open. The former is only detected by great care: it is denoted by a little disturbing cough, and by applying the ear or the stethoscope to the chest, and thus detecting a crepitous rattle. This state must not be confounded with pneumonia, or bronchitis; the history will distinguish them. The second stage is accompanied by the external and more obvious signs of the sinking or dying state, as the tracheal rattle, with the other symptoms already detailed.

Dr. Philip's observations on the order in which the

* On Constitutional Irritation, pp. 106, 107.

functions cease in dying, do not appear to apply to the sinking state, but to the very article of death itself.

I have thus briefly sketched the symptoms and appearances in the sinking state, as far as they appear to me to be interesting to the physician. In a physiological point of view, the sinking state is equally interesting, and I purpose to pursue the inquiry, under that aspect, on some future occasion.

PART SECOND.

THE CURATIVE EFFECTS OF LOSS OF BLOOD.

CHAPTER I.

INTRODUCTORY OBSERVATIONS.

It is one of the most remarkable facts in physic, that if several patients of similar strength and constitution, but affected by dissimilar diseases, be respectively placed in the erect position and bled to deliquium, they will be found to have lost very various quantities of blood. I have known a patient not apparently very feeble, faint on losing four ounces of blood; and I have known patients bear to lose fifty, sixty, and even seventy ounces of blood without syncope.

This fact, plain and simple as it is, with its rationale and practical applications, has, I think, been greatly overlooked.

Its rationale is to be found, I believe, in con-

nexion with an equally interesting fact, that different diseases induce in the constitution different powers or susceptibilities in regard to the effects of loss of blood. Each disease appears, indeed, to possess its own peculiar and intrinsic virtue in this respect. This is determined by placing the patient perfectly erect, and bleeding to incipient syncope; the quantity of blood which flows is the measure of the protective influence of the disease in one class of cases, and of its influence in superinducing a susceptibility to the effects of loss of blood in the other.

An interesting scale of diseases may be formed representing these properties. It would begin with congestion of the head, or tendency to apoplexy; inflammation of the serous membranes, and of the parenchymatous substance of various organs, would follow; then acute anasarca; and lastly, inflammation of the mucous membranes. This part of the scale would be divided from the next by the condition of the system in health. Below this would be arranged fever, the effects of intestinal irritation, some cases of delirium, reaction from loss of blood, and disorders of the same class with hysteria, dyspepsia, chlorosis, and cholera morbus.

Persons in health and of moderate strength, will generally faint if bled in the erect posture, on taking fifteen ounces of blood. I have known seventy ounces to be taken in the sitting posture, in the tendency to apoplexy, without syncope; but the case is

an extreme one. Patients with pleuritis or pneumonia frequently lose thirty-five ounces of blood without fainting. In bronchitis little more is borne to be lost than in health. A stout person in fever will frequently faint on losing ten, twelve, or fourteen ounces of blood. In intestinal irritation, with urgent symptoms even, the abstraction of nine or ten ounces of blood will generally induce deliquium. In delirium tremens, or puerperal delirium, the patient soon faints from loss of blood. The same thing is still more observed in those cases of violent reaction, which arise from loss of blood itself. In dyspepsia, hysteria, and chlorosis, the susceptibility to syncope from loss of blood is very great. And I have known a patient, of good strength, affected with cholera, faint on taking four ounces of blood, although she had shortly before borne to lose nearly twenty ounces without faintishness, under the influence of inflamed mamma.

I imagine that the rationale of this fact will be found in the obvious difference in the nature of these diseases. In all those cases in which the circulation of the heart and larger arteries alone is affected, and especially in such as involve irritation, or exhaustion, there is early syncope on taking blood. But in such cases as consist in an affection of the capillary circulation, and especially such of these as affect the head, it requires the abstraction of much blood, to induce deliquium. Syncope is prevented by the influence exerted by this state of the capillary circulation over

that of the heart and larger arteries, and over the whole system, and especially over the circulation within the brain; and it does not entirely subdue the morbid action of the capillary vessels even when induced. To induce syncope in pure fever, we have then but to subdue the state of reaction in the heart and larger arteries. In inflammation, we have not only to do this, but to overcome the influence of a permanent morbid action of the capillaries; this is especially observed in inflammation of the serous membranes and within the head.

The practical application of this fact, consists chiefly in its affording a rule for bloodletting in all cases in which this measure is required to be fully instituted; a guard against undue bloodletting, both in this and some other cases; and a source of diagnosis.

The quantity of blood which flows when a patient requiring full bloodletting is placed upright and bled to deliquium, seems accurately proportionate to the exigencies of the case. In inflammation much blood should be taken; and much blood will flow before deliquium is induced: in irritation, little blood should be drawn; and there is early syncope from bloodletting. The quantities are even accurately suited, not only to the exigencies of the disease, but to the powers of the system; at least so it appears to me from considerable experience.

The rule is suited also to the degree and the du-

ration of the disease, for, with each of these, its influence in inducing tolerance or intolerance of loss blood is respectively augmented.

It is not less adapted to those most frequent of all events, mixed cases. Inflammation and irritation may be conjoined. For example, there may be mere nephralgia, or absolute nephritis, from calculus, or a mixed case involving both. There may be mingled intestinal irritation, and inflammation. In each of these circumstances, the rule for bloodletting which I have proposed, adapts itself accurately to the demands of these various morbid affections, and to the actual strength and condition of the general system.

It is difficult to say whether more injury has been done by an undue or by an inefficient use of the lancet. In inflammation we must bleed fully. In irritation we must bleed cautiously. Inefficient bloodletting in the former disease, and undue bloodletting in the latter, are alike dangerous or even fatal to the patient; from both extremes we are guarded by the rule which I propose. By directing the patient to be placed in the erect position, and bled to deliquium, we often take much more blood than we should have ventured to prescribe in inflammation, and very much less than we might be disposed to direct in irritation; and in both these cases the rule conducts us to the only safe mode of treatment.

An important question relates to the due repetitions

of bloodletting. This should, in general, be the more prompt, the greater the tolerance of loss of blood in the previous bloodlettings.

A further practical application of this fact, flows from the adoption of the rule. In doubtful cases it furnishes us with a fresh means of diagnosis. If much blood has flowed before syncope occurred, we must suspect inflammation; if little, we must suspect that, however similar the symptoms, the case is in fact of a different nature,—perhaps irritation, perhaps exhaustion.

I have also found that in every case in which early syncope occurs from bloodletting, the more remote effects of loss of blood, as reaction, or sinking, are also very liable to occur; and it is in these cases that sudden dissolution has followed the use of the lancet. There is, in every point of view, intolerance of loss of blood. The reverse of all this obtains in inflammation, which seems to be incompatible, to a certain degree, with the effects of loss of blood, which are, however, very apt to supervene, as the inflammatory action subsides.

It is by the multitude of facts alone, that the propositions which have been stated can be established or corrected. With the view of obtaining these facts, I would now propose, that in every case in which full bloodletting is to be instituted, the patient should be placed perfectly erect in a chair or in bed, and bled to the very first appearance of deliquium: the

quantity of blood taken is then to be noted, and accurately registered in a table. The same thing is to be observed on each repetition of the bloodletting.

And that nothing may be left unattended to which may throw additional light on the subject, to this point I would add, 1. the appearances of the blood, and 2. the effects of its abstraction upon the disease.

These various facts I propose to register in the following manner:

Age and strength of the patient.	Disease, its stage and complications.	Quantity of blood taken.	Effects on the patient and disease.	Appearances of the blood.	Repetitions of the bloodletting.	Effects.

It is obvious that none but the most unequivocal cases should be thus registered. Cases, the diagnosis of which was not perfectly clear, would only add their own obscurity to the investigation.

It is equally obvious that the investigation proposed can only add useful facts, which will in their turn become useful guides to the physician. It is still true, as Celsus has observed,—"*nulla perpetua præcepta medicina recipit.*" To the young practitioner, however, I think the practice proposed will

prove of great assistance; and if it preserve one from the bitter reflection, which some have experienced, of having done too much, or too little, I shall not esteem that my labour has been in vain.

I would observe in conclusion, that I do not think it safe, in any case to bleed to deliquium in the recumbent posture. But there are few cases, if any, in which, if it be proper to bleed fully, danger can accrue from bleeding to the most incipient syncope in the perfectly upright position. Besides the remedy is at hand. It consists simply in laying the patient recumbent, and, if necessary, raising the feet and depressing the head.

It may become a question whether the patient may, in a little time, be again placed erect so as to reproduce a state of slight deliquium, and thus to add to the power of the previous bloodletting in subduing the disease. But I do not think a state of continued syncope free from danger. I have known it lead to delirium.

On the other hand, the influence of an opposite position, the head being placed extremely low, and the lower part of the body being very much raised, has not been sufficiently traced in the various cases of the immediate or remoter effects of loss of blood.

Amongst the other objects of this inquiry, should be that of collecting any modifications or exceptions, in regard to the rule which I have laid down. It cannot be imagined that it should be without excep-

tions. It is as important that these should be pointed out, as that the rule itself should be established. There are two exceptions to the rule which I have proposed, which I would briefly mention. In some cases of fever requiring bloodletting, the patient cannot support the erect position: in such a case, the arm should be first prepared, and then the patient should be gently raised and supported in the upright position, carefully avoiding all muscular effort; the vein should then be promptly opened.—On the other hand, in the case of congestion of the brain from exhaustion, there is not such early syncope from bloodletting as might be expected; and yet it is obvious that the system cannot bear the loss of blood: I have known this to obtain in exhaustion from undue lactation.

It will also be an interesting question whether this rule, in its repetitions, besides excluding undue bloodletting on one hand, and inefficient bloodletting on the other, does not secure the cure of the disease, with the least possible expenditure of the vital fluid.

The appearances of the blood, the effects of its abstraction upon the disease and many other questions will naturally come to be included in the farther prosecution of the inquiry into the effects of bloodletting.

Lastly, the effects and due application of the local

abstraction of blood, by cupping or leeches, will constitute another interesting object of inquiry. This is frequently peculiarly appropriate when general depletion would be totally inadmissible.

I cannot conclude this chapter better, than by adding the following extract from a paper by Mr. Heming, whom I have already had occasion to mention in this work, and than whom I know of no one who enters better into the true spirit of inquiry, whether it be in regard to points suggested by his own mind or that of others. In a letter addressed to the Editor of the Medical Gazette, No. 93, this gentleman observes,

"I was present during the course of the last winter, at the reading of Dr. Marshall Hall's paper on bloodletting, before the Medico-Chirurgical Society; and I afterwards read the report of that paper, and the additional remarks of the author, in your journal, Nos. 54 and 57. I took a deep interest in the principles detailed, and determined to submit them to the test of experiment and observation.

"The result of my attention to the subject, I beg to lay before your numerous readers. It may induce them to pursue the inquiry for themselves, and to follow my example in submitting the facts they may observe to the profession.

"The first thing I did was to look over various medical writings, with the view of ascertaining

whether there were already any facts upon record bearing upon the question. I soon found, upon your own pages, many cases in point; and first, the very interesting one of Dr. Badeley, in your 13th number, for March, 1828, page 368; my attention was next excited by the account of a case by Mr. Smith, which almost immediately follows your report of Dr. Hall's paper, in your 54th number, page 63; and again by the case which immediately follows Dr. Hall's own communication, in your 57th number, page 158, by Mr. Darby. Dr. Badeley's and Dr. Darby's cases are given expressly to show how much blood may be borne to be lost under some circumstances, and they are both cases of pleuritis. In Mr. Smith's case, the patient never "rallied after the bloodletting," and it is a case of delirium tremens. My attention is once more forcibly drawn to this subject by a paper in your number for August the 8th, page 300, by Mr. Newstead, entitled, "Remarks on a peculiar class of diseases resembling inflammation." Mr. Newstead observes, "I was astonished at the small quantity of blood which commonly flowed before syncope was produced,"* &c. Lastly, my attention has been drawn to this subject more forcibly than ever, by the perusal of Dr.

* "I would remark, that Mr. Newstead's observations, however interesting, are entirely anticipated by Dr. Hall, in his remarks on intestinal irritation, &c.; and rather denote the propriety of some new and appropriate denomination for this class of cases."

Gooch's recent work, entitled, "An Account of some of the most important Diseases peculiar to Women." In this work two kinds of puerperal disease are described: the first is inflammatory, and bears bloodletting; the second is different from inflammation; and in these bloodletting led to early syncope, and if injudiciously used or repeated, to a fatal termination.

"The general result of this cursory glance, chiefly over your own pages, is, that some diseases bear bloodletting remarkably well; others remarkably ill. But it may be said that this has been long known. This may be true; but has the principle ever been so accurately stated—has it been made of any practical utility—has it been made available as a guide for the use and measure of bloodletting, and as a diagnostic? I venture to say that it has not; and to add, that those who will take the pains, which I have done, to possess themselves of the facts involved in this inquiry, will find themselves richly rewarded by the confidence with which they will thenceforth prescribe or adopt the measure of bloodletting, in cases in which they might otherwise have been long held in doubt and suspense.

"I will now proceed to the detail of my own experience since I adopted the mode of bloodletting proposed by Dr. Marshall Hall.

"I bled a stout man, aged 35, on the eleventh day of fever: he was flushed, his skin hot, and his pulse

120; he fainted on losing ʒiv. of blood. On the next day I found him much better, indeed convalescent.* In another case, not dissimilar, ʒviii. of blood flowed, and syncope occurred.

"Four cases were unattended by any inflammatory affection, and in each there was considerable disorder of the stomach and bowels, indicated by the alvine evacuations being discoloured, offensive, and scybalous; the tongue loaded, particularly at the back part and middle; and the breath offensive. The average quantity of blood lost in all these cases was very small; and in one, although a strong young man, complete syncope was produced by the loss of ʒxv. and the fainting returned for some hours, whenever the body was raised up.

"Four cases were instances of inflammation of the mucous membranes, and in these it will be observed that the average quantity of blood lost was about ʒxv.

"With the exception of one, a case of convulsions, occurring in a child with hooping-cough, all the others were those of inflammation of serous membranes or parenchymatous substance; in these the quantity of blood lost was very large, generally upwards of ʒxxx.

"In a case of peritonitis, in a girl only nine years

* "Six months afterwards this same patient was bled under the influence of lumbago; he lost ʒxvi. of blood without experiencing the least disposition to syncope."

of age, not remarkably strong, the quantity of blood lost was particularly great; she had been affected two months before with measles, which was succeeded by general anasarca; the latter complaint was removed by purgatives, and ten days afterwards she had an attack of peritonitis. I saw her eighteen hours after the commencement of pain; she was lying on her back, with her knees drawn up, her breathing quick and painful, and her belly swollen, and so tender, that she cried out upon the slightest touch; ℥xx. of blood flowed before there was the slightest disposition to faintness; when syncope did come on, it did not occur to an excessive degree; and upon recovering from this state, she had lost her pain and tenderness, which never returned. It is remarkable that from the loss of so large a quantity of blood she sustained but little inconvenience, and was well in a short time.*

"One patient had suffered from tenderness about the region of the liver, with hardness and enlargement at the part for some months; but at the time I bled her, her complaint assumed more an acute character than formerly, being attended with considerable pain. The pain was relieved, but there was still remaining some tenderness and enlargement. She lost ℥xxxix. of blood, and fainted.

* "There is scarcely a case on record in which so much blood was drawn at this early age."

"In one case, in which, from the age, habit, and symptoms, I supposed the patient to be threatened with apoplexy, the loss of blood was considerable, for the age of the patient, without producing the least disposition to syncope. Another was a case of slight paralysis, occurring in a man of strong constitution and florid countenance; and the loss of blood which he sustained before fainting was equal to that which was borne by some of the patients who had inflammation of a serous membrane.

"One case of affection of the head, arising from other causes than inflammation, yet attended by many of the symptoms of phrenitis, I witnessed in a near relative; syncope was induced by withdrawing ℥ix. of blood. I was called to what I considered a similar case, and sent my assistant to bleed her, and stated before he returned that there would be early syncope; he abstracted ℥xl. of blood! I was surprised at the result; but on inquiry and reflection, it was perfectly accounted for. The patient had bled ill, and much time was lost in taking the blood; in such circumstances I would remark that more blood may be taken, even if the patient be erect, than he may be able to bear. But besides this, there was a state of chronic inflammation of the hip-joint, which I did not think of at the moment: this enabled her to bear the loss of a large quantity of blood.

"I bled a young person, aged 21, of moderate

strength, and affected with fluor albus, two months ago, and again a fortnight ago, at her own request. She had been accustomed to this kind of discipline. She fainted each time on losing ʒxij. I saw this patient yesterday, labouring under rubeola, with an inflammatory affection of the chest. I bled her in the same manner to slight syncope, and she lost ʒxxxij! To-day she is greatly relieved, and doing well. So obvious is the protective power of inflammation, and so practical and diagnostic is the mode of bloodletting.

"On two different occasions I bled the same patient, with inflammation of the mamma, and afterwards in cholera morbus. In the former case she lost ʒxx. of blood; in the latter she fainted just when ʒiv. had flowed!

"I must also add, that the proper mode of performing the operation of bloodletting is, first to prepare the arm; then gently to raise and support the patient; and then to make a free opening into the vein. If the blood flows well, I think the rule is safe; if it flows slowly, too much might be taken, and especially if it become necessary to open another vein. I have observed that if syncope be allowed to take place under a slow detraction of blood, convulsions are more apt to occur than when the flow of blood is prompt and rapid.

"The general results of these cases, and my own experience, coincide entirely with the statements

made by Dr. Hall. Some diseases enable the system to bear bloodletting; others render it incapable of bearing loss of blood. The former are, congestion or inflammation within the head, inflammation generally, but chiefly of the serous membranes and parenchymatous substance, at least that of the mucous surfaces; the latter are, some cases of delirium, and of variously seated pains and tenderness unattended by inflammation, but connected with intestinal disorder, previous loss of blood, and what must still, I fear, be termed a nervous condition of the system."

This interesting paper is accompanied by an equally interesting registry of thirty-one cases, illustrative of the powers or susceptibilities of the system, in regard to bloodletting in different diseases, and confirmatory of the remarks I had made on the subject. I know not a more interesting or important medical record. I may possibly subjoin it, with some additions and alterations, at the end of this volume.

CHAPTER II.

OF SOME DISEASES IN THEIR RELATION TO LOSS OF BLOOD.

In the preceding chapter I have given a cursory sketch of the very varied powers and susceptibilities of the system in regard to the effects of loss of blood, in various diseases. I purpose now to enter upon this question more particularly.

I. *Of Fever.*

The different forms and complications of fever and of inflammation, doubtless constitute the most frequent as well as the most important cases of acute diseases. In their intimate nature, and in their relation to the effects of loss of blood, pure fever and pure inflammation are widely different.

There have been long disputes, indeed, whether fever ever be perfectly pure, that is, independent of inflammation. In a practical point of view, I think it the safest plan to regard fever as occasionally truly

idiopathic, but as extremely liable to be conjoined with inflammation.

Whoever is imbued with an accurate knowledge of physiology will, I think, perceive in the phenomena of fever, much that is to be distinctly referred to the state of the nervous system: the alternate chills and heat, the tendency to vertigo, the muscular tremors, the affection of the various secretions, are plainly of this character. With this, the vascular system soon participates. They form a whole which suffers together.

Fever seems to differ from inflammation in being an affection of the whole nervous and vascular systems; in inflammation there is an affection of these systems in one part or organ.

There is another difference between these two diseases: fever appears to consist in an affection of the nervous system and of the heart and larger arteries, the capillary vessels being only affected as an extension of this morbid state. In inflammation there is, according to the experiments of Dr. Wilson Philip, and Dr. Hastings, a primary affection of the capillary vessels, consisting in enlargement of their diameter and a slower movement of more numerous globules of the blood. A consequence which flows from this view of the subject is, that to subdue momentarily the state of fever, we have only to subdue the augmented action of the heart and larger arteries; but as the capillary circulation is less imme-

diately under the influence of the heart, the action of the former may be subdued, whilst a morbid state of the latter may be continued with comparatively little change.

It is upon this principle, I believe, that a fact is to be explained which will be frequently adverted to in this work, that syncope is more readily produced by the abstraction of blood, in pure fever, and in other diseases consisting alike in the state of the heart and larger arteries, than in pure inflammation, consisting in a peculiar condition of the capillary vessels, more permanent and less under the influence of the general circulation.

In the former case, syncope is the simple effect of depriving the heart and arteries of their accustomed stimulus, and this probably under circumstances of augmented susceptibility of the nervous system to impressions of this kind; in the latter, although blood may be taken, and the action of the heart and arteries be thus subdued, yet from a less degree of susceptibility of the nervous system, and from the unsubdued morbid action of the capillaries, acting as it were as a permanent stimulus to the general system, syncope is not so soon induced by the abstraction of blood. But whatever the explanation of this fact may be, the fact itself is, I think, established upon the sure ground of multiplied experiment.

There are three circumstances in fever which should lead to the use of the lancet. The first is,

excessive reaction of the vascular system; the second, much excitement of the nervous system, especially violent delirium; and the third, and the most imperative, the existence of local inflammation. Each of these cases will require a few observations.

In excessive vascular reaction, bloodletting is of the most essential service, especially early in the disease. The quantity of blood which should be taken must depend upon many circumstances, as the strength of the patient, the stage of the disease, the character of the epidemic. But the limit, beyond which it would be dangerous to go is, I think, clearly marked out by the degree of susceptibility to the effects of loss of blood, denoted by the tendency to syncope on abstracting blood pretty freely in the erect posture. But as I shall recur to this question, I would only repeat, in the present place, that the susceptibility to the effects of blood, is far greater than in inflammation. I have known very stout persons in the strong reaction of fever, faint on withdrawing four, six, eight, ten, and twelve ounces of blood in the erect posture.

The same observations may be made in regard to great nervous excitement denoted by delirium. To abstract a moderate quantity of blood does great good. But to bleed too freely is dangerously to depress the powers of life. In this case, as in the last, the patient may safely be placed in the erect

posture, and bled to incipient syncope, if it be a first bloodletting and early in the disease.

But the most marked difference in regard to the powers of supporting the loss of blood, is superinduced by the addition of a local inflammatory affection to the original disease. The patient immediately becomes less prone to faint on being bled. It will be obvious how important it would be to establish this point accurately by an ample collection of facts; and thus to trace it in its reference to practice. It appears to me, from what I have hitherto ascertained, that there is, in every instance, a strict alliance between the degree of tolerance of loss of blood and the exigencies of the cure.

2. *Of Inflammation.*

My remarks must be very brief upon a subject, generally speaking, so well understood as inflammation. I would observe, however, that this disease is not necessarily ushered in by rigor, or attended by heat of skin; in the severest cases rigor does, however, occur, and then a degree of heat of surface usually follows; but in the other cases in which these phenomena are observed, the rigor generally depends, I think, upon a superadded cause, existing in the state of the bowels, and the heat upon this cause, or upon the use of remedies. I have also observed that the pulse, in pure inflammation, is

frequently very little accelerated at first; it is so however in the severest cases, and it becomes so during the continuance of the disease, and of course of the remedies. In pure inflammation, except of the encephalon itself, the head is frequently very little affected, and there is neither headache nor vertigo; these symptoms may, however, eventually occur, together with delirium, as the result of depletion and exhaustion.

Indeed it may be observed, in general, that the functions of the nervous system are little affected by pure inflammation, in its earlier stages, and in its more usual forms. Inflammation which is extreme in violence or diffusion, does indeed terribly affect the nervous powers; and in its latter stages, it may doubtless produce the same effects; but in this latter case, the circumstance of inflammation is usually combined with those of exhaustion, the result of the appropriate treatment; so that it may be considered as no longer a pure but as a mixed case.

But the remark of greatest moment which I would make in this place, is, that pure inflammation induces a state of the system which protects it from the influence and effects of loss of blood. A patient under the influence of pure inflammation, will bear to lose a far greater quantity of blood without experiencing syncope, than the same person in health. This fact is of the utmost interest and importance in a practical point of view.

Inflammation is a sort of concentrated and permanent stimulus, exciting and maintaining the powers of the system. Under its influence bloodletting is fully borne. It may at length exhaust the powers of the system, and then the state of sinking supervenes. Or it may be subdued by the bloodletting and other remedies employed for it, leaving the system under the influence, greater or less, of those remedies.

But whilst it does exist, it constitutes a stimulus and a protective power against the influence and effects of loss of blood. Syncope even does not remove it; syncope merely subdues the constitutional effect of the stimulus of inflammation; and except when that inflammation has been of recent origin, it is found still to exist on the reaction; by inducing repeated or excessive syncope, however, it may come to be perfectly subdued, and then it is usual for this reaction to be excessive, the stimulus which protected the system from the effects of loss of blood being removed.

It is in this manner that inflammation differs in its protective influence from mere fever; in the latter syncope subdues all the actions; in the former those peculiar to the inflammation still subsist, being, in great measure, independent of the action of the heart.

This fact obtains, according to my experience, in a more marked manner in inflammation of the ence-

phalon than in that of any other cavity of the human body; and in inflammation of the serous membranes, and of the parenchymatous substance, than in that of the mucous membranes. Early in February I was called to a gentleman, forty years of age, and very far from robust, suffering from deep-seated pain in the forehead, slight intolerance of light, a degree of quickness in his mode of speaking, and wakefulness; the state of the skin and the pulse being natural. He had been bled to eighteen ounces the day before, without its having induced either syncope or relief to the pain and other symptoms. I directed him to be placed in the erect posture, and bled from a moderate sized orifice, until syncope should be induced. This prescription was repeated on the two succeeding days. The quantities of blood taken were twenty-six, twenty-four, and twenty-two ounces respectively, leeches having been applied, and the most energetic purgatives having been administered. This case was obviously one of inflammation of the encephalon, not of the most violent character. The quantities of blood taken, on each of four successive days, were such as would not have been borne had not the tendency to syncope been far less than in health, by the peculiar and specific influence of inflammation.

I have drawn a similar inference from having observed the degree of resistance to syncope from loss of blood which has obtained in other cases of inflam-

mation, especially pleuritis and peritonitis. In these diseases the system bears the loss of blood almost as well as in arachnitis itself. It would be in vain to load this work with examples. Indeed such inferences are not to be drawn from a few cases, but must be the collective results from many. And I purpose to give in this place these results of my experience and investigation of this interesting question, rather than to detail the numerous facts from which they have flowed.

Inflammation of the bronchia, or of the mucous membrane lining the bowels, has not appeared to me to protect the constitution in an equal degree from the occurrence of syncope on the detraction of blood.

Inflammation not only renders the system less susceptible of immediate syncope, but also of the remoter effects of loss of blood. Such effects indeed are very apt to supervene at the moment the state of inflammation has subsided, and its protective influence, of course, been withdrawn.

The following case strikingly illustrates, first, the protecting powers of inflammation in regard to the effects of loss of blood; and, in the second place, these very effects when this peculiar influence of inflammation is withdrawn.

Mrs. ——, aged 30, and of moderate strength, had suffered from pain in the right hypochondriac region for a month, when on the evening of the 14th of May, 1828, it became extremely acute.

On the morning of the 15th, it continued very severe, interrupting the respiration, and preventing the patient from assuming the recumbent position; the pulse was 90, full and hard; the surface hot. She was placed quite erect, and bled to syncope; this took place when thirty-nine ounces of blood had flowed, the pain being relieved but not entirely removed. Calomel and purgative medicines were given. In the evening the pain had increased, the pulse remained as in the morning, the medicines had acted well; Mrs. ——, was again placed in the erect position and bled to syncope, and the same quantity of blood flowed as before; the pain being quite removed. A blister was applied, and the medicine repeated with colchicum.

On the 16th, the pain continued relieved; the countenance was pallid; the pulse less frequent; the skin cooler.

On the 19th, there was no pain of the side, the countenance was pallid, but apt to flush frequently; the pulse was 96, and throbbing; with much throbbing of the head, ringing of the ears, and complaint of weakness.

On the 20th, Mrs. —— was found subject to flushing, palpitation of the heart, and frightful dreams; the pulse was 90, but without throbbing; the respiration unattended by pain; but there was still some degree of tenderness on pressure in the right hypochondrium.

In another case the most active bloodletting had been employed to subdue peritonitis. An abscess formed, however, and burst into the bowels. At this moment the most acute symptoms of reaction from loss of blood were set up, and the patient suffered from the most violent throbbing pain of the head, intolerance of sound, palpitation, &c. In a third case detailed to me by Dr. Abercrombie, a similar tumor formed on the right side of the pelvis; the inflammation of this tumor greatly subsided by the use of the ordinary remedies; but the patient became affected with delirium. Such cases having been fatal under other treatment, Dr. Abercrombie prescribed a glass of wine to be given every hour. After the fourth glass the patient was found composed. The tumor eventually suppurated externally, and the patient did well.

Some gentlemen have objected to the induction of syncope, thinking it particularly apt to be followed by reaction. I would observe upon this point, that I do not recommend that the bloodletting should ever be carried to actual syncope, but only to the very first signs of approaching syncope, which is, in fact, to be prevented by immediately laying the patient in the recumbent position. In most of those cases in which much reaction has followed syncope, I believe that there either was not inflammation, or that the inflammation was completely subdued by the bloodletting. In each of these cases it has been seen, that

reaction is very apt to supervene upon bloodletting, whether syncope be or be not induced. In no case have I seen this reaction do any other injury than that of inducing its new and peculiar train of symptoms; it has never appeared to me to aggravate the original disease.

But there is another remark of the utmost moment, which I must make, though cursorily, in this place, as it will require a more particular notice hereafter. It is, that at the very moment the protective influence of inflammation is withdrawn, further bloodletting is in the highest degree dangerous. I have known several instances of the fatal issue of bloodletting when this measure has been instituted as a preventive against the recurrence of symptoms of inflammation which had been subdued by previous bloodlettings.

If I were to venture to state the average quantities of blood which would flow in the different cases and forms of inflammation, I should mention forty ounces for arachnitis, from thirty to thirty-five for pleuritis or pneumonia, and fifteen for bronchitis. This simple statement cannot fail to strike the medical reader. It is impossible to foresee at once all the advantages which must flow in practice, from these important differences in the powers or susceptibilities of the system in regard to bloodletting in these different diseases.

I think it important to mention, in a very especial

manner, that in some forms of acute anasarca, there is great tolerance of loss of blood.

3. *Of Irritation.*

I proceed to notice a morbid affection of very frequent occurrence, and with which the profession generally appear to me still to be totally unacquainted. This statement will not be deemed too strong, if I am enabled to show that there is a series of cases not generally distinguished from certain inflammation, and yet very different in their nature, and especially in their reference to the effects of loss of blood.

The cases to which I allude, resemble, in their symptoms, the most acute forms of arachnitis, pleuritis, and peritonitis, but especially arachnitis. Yet instead of possessing the power of resisting the effects of loss of blood belonging to inflammation, there is the utmost degree of susceptibility to those effects. *In the former cases thirty, forty, and even fifty ounces of blood may flow before the slightest deliquium is observed; in the latter there is frequently the most perfect syncope on abstracting nine or ten ounces of blood!*

The irritation of a calculus in the ureter, or in the hepatic duct, is well known to occasion a remarkable sympathetic affection of the stomach. The introduction of a bougie into the urethra sometimes induces

rigor and a complete paroxysm of fever. Uterine irritation is not less frequently the cause of extraordinary effects upon the system generally and upon various organs.

But of all the sources of sympathetic morbid affections, irritation in the stomach and bowels appears to be the most common, and certainly not the least important. Indigestible substances taken, and disordered fæculent matter retained, are the frequent sources of that combined affection of the head and the stomach, termed sick headache.

If such effects of local irritation upon distant organs, then, be universally known and admitted, it cannot be considered as extraordinary that others less recognized should exist. But such a point is to be established by facts, not by argument. I proceed therefore to detail some cases, which will, I doubt not, if perused with attention and without prejudice, fully convince the reader of the occurrence of a form of a disorder hitherto overlooked, or mistaken for other diseases, but very distinct, and very important to be distinguished.

The most frequent cause of this affection is a disordered state of the contents of the colon ; the next is, some indigestible substance taken into the stomach. But as the mere presence of a calculus in the ureter is not always sufficient alone to induce an attack of pain and vomiting, so a deranged condition of the intestinal contents will not, alone, induce an attack

of the morbid affection which I am about to describe; in general some superadded cause, some shock sustained, or some effort made by the system, is necessary to rouse into activity the cause of irritation otherwise dormant. In the same manner, indigestible substances may frequently be taken, when the health is unimpaired, with impunity; but if the system be under the influence of shock, or effort, or of nervous or vascular excitement or exhaustion, a cause of disorder which might have been inert in other circumstances, proves of frightful activity.

The effects of intestinal or nervous irritation, are chilliness, varying from coldness of the extremities to extreme rigor, followed by great heat of the surface, and symptoms resembling those of arachnitis or peritonitis, singly or successively, in their most acute forms, but especially arachnitis; more rarely there is pain resembling that of pleuritis: more rarely still, a peculiar pain passing along one side of the neck to the shoulders; and occasionally, generally after bloodletting, there is palpitation of the heart.

It must be regarded as extraordinary that such marked affections have not been discriminated, and traced to their proper source. But I am persuaded that they are, to this day, confounded with inflammation of the organs chiefly affected, to the great injury, and even danger of the patient. It is indeed extraordinary how slow the human mind is to receive

new impressions, even of the truth, wedded as it usually is to first opinions.

These observations apply particularly to that form of this affection which resembles arachnitis. There are few who distinguish it from arachnitis itself. I have, however, witnessed some very interesting scenes, and not less interesting convictions of the truth of the views which I have taken of this subject, in cases which have occurred in the persons or in the families of medical gentlemen themselves. Two of these cases I propose to detail briefly ;* premising, that the mere fact of the most acute symptoms, resembling those of arachnitis or peritonitis, having yielded without the abstraction of blood altogether, or without a shadow of that degree of bloodletting which is absolutely necessary for the cure of these inflammatory diseases, is alone sufficient to convince us that there is a case of morbid affection resembling in its symptoms, but differing in its nature and treatment, from those diseases.

Amongst the earlier cases of the effects of irritation which excited my attention, was that of Mrs. ——, a rather delicate, married woman, aged 35. When I was first called to this patient she appeared to labour under inflammation of the periotonæum ; the symptoms of which were so severe as apparently to demand the repeated employment of the lancet,

* See pp. 184, 185.

and application of leeches, so that the patient lost about thirty-five or forty ounces of blood; the bowels were freely purged, the stools were very fetid.

All the symptoms were removed on the third day, I only visited my patient once, and I had every hope of a speedy and secure convalescence. I was, however, disappointed. Early on the succeeding day I received an urgent request to see her. She had been seized with severe pain of the head, especially over the eyebrows, attended by beating and throbbing, and by the most urgent intolerance of light, so that the eyes could not be opened for a moment for examination; the pain was increased on attempting to sit up erect; the countenance was palish and sallow; the pulse full and frequent; there was no faintness or sighing.

As this case occurred very early in my investigation of the effects of irritation, I hesitated in determining whether the symptoms were such as I had already witnessed in one or two cases as arising from that cause, or were indicative of inflammation within the head. I prescribed a draught with thirty drops of the tinctura opii and of the spiritus ammoniæ aromaticus, and called again in an hour and a half, not without anxiety. I was greatly relieved to find my patient better in every respect, able to bear the light, suffering much less pain, and having enjoyed a comfortable sleep after a night of wakefulness and distress. Aperient medicine was administered, and,

after the full evacuation of the bowels, light nourishment, and a repetition of the draught with tinctura opii and spiritus ammoniæ aromaticus, whilst a cold lotion was applied to the head.

On the succeeding day Mrs. ——, was better in every respect, but complained of any noise. On the next day she was comparatively well, only suffering from vertigo on raising the head.

From this time the recovery was progressive and uninterrupted, the utmost care being taken to regulate the bowels and the diet.

Mr. ——, aged 19, complained on Sunday evening, September t e 29th, of pain shooting through the region of the stomach to the back, recurring at intervals; he took some ginger tea, was relieved, went to bed, rose in the morning, looking pale, but expressing himself better, went into the counting-house, and ate his dinner of cold roast beef as usual.

About five o'clock in the afternoon of the 30th, he became affected with coldness of the hands and feet, slight flushing of the face, violent aud constant pain of the crown, or, as he said, of the bones of the head, numbness of the right hand and contraction of the right side of the lip, and slight incoherence of manner; he answered hastily and sharply to any questions, and experienced restlessness, and extreme intolerance of light or noise, and desired that the shutters might be accurately closed, and that the door should not be moved. About two hours after

this attack, sickness came on, a great load was vomited, and he became more collected, but still complained of pain of the bones of his head, and of the slightest light or noise. In another hour he fell into an uneasy slumber, breathed hard through the nostrils, awoke in half an hour a little easier, his hands and feet becoming warmer.

He took a cup of bohea tea, and a dose of calomel and jalap at ten o'clock P. M.; he lay more composed, then dozed at intervals, but always complained on awaking of pain of the head; at two o'clock he slept more quietly; his medicine acted three times; he rose in the morning much refreshed but looking dull and sallow. He continued to recover during the day, rode out, ate his dinner, but still looked ill.

The next patient, an intelligent surgeon, tall and robust, had undergone a painful operation on the anus, and had suffered much for six days on passing the fæces and on dressing the wound; he had kept himself low, and had passed restless nights as well as painful days. On the morning of the sixth day, after some exertion, the feet and legs became extremely cold; the surface afterwards became generally heated and the mouth clammy; the face was flushed, the skin sore, and the eye-balls particularly tender: the pulse rose to 96. In the afternoon the chillness returned, and was followed by heat, throbbing in the temples, and pain in the head, with flying stitches in the side; the pulse was 112. Sixteen

ounces of blood were taken from the arm; faintness and perspiration were induced, the throbbing ceased, but the pain continued, and the pulse was 116; the patient felt overcome, became restless, and affected with vertigo on moving, and frequent sighing.

At night the head became distractingly painful; the faintness exceedingly distressing; I found my patient with wet cloths applied over the forehead and eyes. The question of further bloodletting or of the application of leeches was proposed to me. I was persuaded, however, that the affection of the head depended upon intestinal and nervous irritation. I therefore prescribed a large enema of gruel and oil; with sal volatile, and nourishment.

The enema induced vomiting and a copious alvine evacuation. On the following day all symptoms of affection of the head had subsided.

In this case the natural strength of the patient, the violence, and even urgency, of the symptoms, the recovery without further bloodletting, and the extreme susceptibility to the effects of loss of blood are all remarkably displayed, and form a striking contrast with the characters of true arachnitis.

The following case is not a less interesting illustration of this morbid affection.

Mrs. ——, aged 24, and of moderate strength, had suffered from an attack similar to the one about to be described, some months previously. She remained well until excited to undue exertion by company

and visiting. She then began to complain of pain of the head, of a sense of fatigue, and of being unrefreshed by her sleep.

Two days afterwards the hands and feet became very cold alternately with great heat of the skin; and the pain of the head had augmented.

In two days more the symptoms had still further increased: the coldness of the extremities was attended by great pain, and succeeded by extreme dryness and intense heat; there was severe pain of the head and along the right side of the neck; the tongue was loaded, and œdematous; the stomach affected with nausea; the bowels disordered, and the fæces scybalous.

During two other days these symptoms only augmented, the patient still attempting to remain up; the pain of the head increased and became attended with great intolerance of light, and throbbing, unabated by aperient medicines, and by further rest. It was thought right to take a little blood. Mrs. —— was therefore put in the erect posture and the stream allowed to flow until faintishness took place; complete syncope was produced by abstracting ten ounces of blood. The distressing symptoms still however continued the next day, when medicines were administered which induced vomiting and free evacuations of scybalous and disordered fæces.

From this time the recovery was gradual, but delayed by a disposition to diarrhœa, and by a state of

prostration, paleness and thinness, highly peculiar and characteristic.

In both these cases the symptoms of affection of the head persisted after the bloodletting, and were relieved by sickness and a free evacuation of the bowels. In both, the prostration from the bloodletting was extraordinary.

The next case is that of Mrs. ——, a young married lady, in the fourth month of pregnancy, habitually costive. The present attack came on after much fatigue in travelling; and she is stated to have experienced a similar one formerly.

On the 7th of October, she complained of pain of the head, and leeches were applied to the temples. On the 8th the pain of the head was more violent and attended with much throbbing of the temples; and to these symptoms pain of the right side under the breast, a sense of tightness across the chest, and hurry in breathing, were superadded. Twelve ounces of blood were drawn, and an efficient aperient medicine was given, and on the 9th and 10th she was much better; and a saline medicine was prescribed.

On the 11th she was again taken worse, after imprudently sitting up; the beating of the temples, tightness across the chest, and difficulty in breathing returned, unattended by cough. Sixteen ounces of blood were taken from the arm, with great relief, and the aperient medicine was repeated.

The patient was relieved, and continued better on the 12th. In the night of the 13th the medical attendant received an urgent message to visit his patient, and found her affected with severe pain and beating of the head, great tightness and pain across the chest, and with violent palpitation of the heart. Twelve ounces of blood were taken, and calomel and other aperient medicines given, with considerable relief.

On the 14th a physician was consulted, who prescribed the pil. hydrarg. with an aperient draught. In the night the apothecary was again sent for, all the symptoms having returned, and now, for the first time, with the addition of a slight cough. Eight ounces of blood being drawn, great relief was obtained.

In the night of the 16th the medical attendant was again sent for; all the symptoms had returned in a still more aggravated form, the pain of the head, tightness across the chest, palpitation, and cough being extremely severe. Eight ounces of blood were drawn without relief; the head was shaved, a cold lotion applied, and a blister ordered for the back of the neck.

On the 17th I saw the patient for the first time: there were much pain and throbbing of the head, which felt benumbed and heavy as if she could not raise it from the pillow; there had been no sleep; the pupils were extremely small, with intolerance of

noise and disturbance of any kind; there were palpitation of the heart and sometimes faintness and a feeling of sinking or dying; there were a sense of tightness across the chest, oppression in the breathing, and a peculiar tracheal or laryngal cough; some pain in the region of the uterus increased by pressure, but no vaginal discharge;—the countenance was usually pale, but sometimes flushed, the tongue extremely loaded, and even black at the back part; the alvine evacuations, on giving purgative medicine, were still, at first, dark-coloured, offensive, and scybalous, and afterwards, offensive, and like yeast; the pulse was 120.

I was forcibly struck by a general but marked resemblance of this case, to those already given, and to others of the same nature which I had witnessed; the depleting plan already fully adopted and repeated, had proved ineffectual in affording lasting relief; the purgatives hitherto given, were, I believed, inefficient. The plan I proposed was, to give efficient purgatives, to restrain their operation by draughts with tinctura opii and spiritus ammoniæ aromaticus, to support the strength by means of nourishment given every hour or oftener, to procure sleep by anodyne enemata, to guard against exertion or fatigue, noise or disturbance. The recovery was uniformly progressive; there was not even one recurrence of the painful attacks; the symptoms gradually disappeared, the pulse becoming natural,

the pupils of the natural size, the head and chest relieved, and the bowels daily but fully moved; quiet sleep, and a good appetite returned.

In six days the patient was convalescent; shortly afterwards she bore a long journey home without any ill consequences, and at the proper time, had a safe delivery.

Those forms of this morbid affection which resemble peritonitis and pleuritis are equally characterized and distinguished by alternate chill or rigor and heat, frequency of the pulse, and susceptibility to the effects of loss of blood. They do not occur so frequently or distinctly as the affection of the head. Such cases are, however, occasionally met with. M. Andral has noticed them in his "Clinique Medicale," Tom. i. pp. 51—54.

The following case of supposed metastatic inflammation, taken from the Edinburgh Medical Journal, in fact illustrates the results from a varied character of this affection.

Mrs. F. a young married lady, had felt unwell for some days in consequence of slight cold. Her medical attendant, Mr. F. had bled her copiously the preceding evening, apprehending symptoms of enteritis. She was of a spare and slender make, the mother of two children, generally healthy, but subject to severe and frequent constipation of the bowels, which seemed to form the ground-work of her present complaint.

"On my visit," the writer observes, "I found enteritis established in its most acute form, nor had the previous bleeding produced any mitigation of her sufferings. A vein was immediately opened, and she was bled ad deliquium; the warm bath, calomel and nitre of each three grains every four hours, and a solution of manna in strong senna tea, (the only laxative that could remain on her stomach), were ordered. Next day the symptoms had remitted, but it was necessary to repeat the bleeding, and to apply many leeches to the abdomen. The bowels were now freely purged, the evacuations black and offensive to a degree I have seldom witnessed. On the third day the mouth was sore, the abdomen free from pain, all the symptoms favourable, except a quickness of the pulse, which, I thought, was attributable to the action of the mercury: I therefore consigned my charge to my medical friend; but I was surprised, on the day but one succeeding, at being requested to see Mrs. F. again, and still more so, to find very marked symptoms of inflammation of the brain. These had come on in the course of the previous afternoon, without any intelligible reason, (except that the bowels had become constipated.) I was certain, from the prudence of Mr. F., that no stimulant, either in food or drink had been given. The intolerantia soni et lucis was so great that she could not bear the slightest motion about her, not hardly permit me light enough to conduct my ex-

amination. She complained of intolerable weight and oppression of the head, vivid flashes of light constantly before the eyes, urgent thirst, the tongue was coated, the pulse full and labouring, the skin hot, &c.; no delirium; no pain upon pressure of any part of the abdomen; the mouth still sore. Copious depletion was again had recourse to, a blister to the nape of the neck, the head wrapped in towels kept constantly wet with vinegar and water, large doses of ext. coloc. comp. with calomel twice a-day, assisted by the former mixture of senna and manna, and a mixture of antim. tart. et potass. nit. every four hours. The pressure of other engagements prevented my seeing her oftener than every other day, a circumstance I the less regretted, from the constant attendance of her brother-in-law. At every visit but my last, I was obliged to bleed ad deliquium, or until sensible relief was obtained, besides applying numerous leeches every day. She was never delirious, always protruding her arm for the lancet and expressed the relief she felt while the blood was flowing: it never had a true buffy coat, but the crassamentum was remarkably firm and fibrous. After the second bleeding, the pain was confined to the right hemisphere, on which side a blister was applied and kept open till it formed a running sore. At my fourth visit the pain in the head was sensibly abated, but symptoms of abdominal inflammation had supervened. This the bleeding of that day conquered.

The bowels, notwithstanding the large doses of purgatives, were with difficulty kept soluble, the disorder sensibly yielding as the evacuations became more natural. The soreness of the mouth, which never amounted to ptyalism, subsided during the attack, and never again recurred. At my sixth visit, I took leave of my patient with sanguine hope of her permanent recovery; yet within a week I was again called to her, in consequence of a severe attack of pleuritis. I understood that the pain in the head had returned a few days after I saw her, and that her brother had found it necessary to continue, in a modified degree, my plan of treatment. As she slowly recovered, difficulty of breathing, and pain in the side came on, and at length a very marked case of pleurisy was established. Almost in despair, I again began the evacuating system, and at length had the pleasure of subduing this last attack, but not without repeated bleeding, leeching, and blistering. My patient was by this time terribly wore down, and in my opinion inflammation had nothing to fasten upon. However, a few weeks in the country soon restored her to her usual appearance."

I consider it quite certain that this case was not one of inflammation, but of intestinal irritation, and of its effects on several organs in succession. If so, I need not insist on the necessity of forming an accurate diagnosis of these two diseases in order to the adoption of an appropriate mode of treatment. The

case itself, which I reprint, notwithstanding the different view I take of it, with the approbation of its candid and liberal author, is indeed "peculiarly interesting and affords ample scope for meditation." All of us, I think, have drawn similar conclusions from similar premises, and if those conclusions be in fact erroneous, it is of the utmost consequence that they should be corrected.

Having thus given several cases of this morbid affection, I proceed to the further detail of its symptoms.

It generally begins in the manner of a sudden attack. This attack is usually ushered in by rigor, indeed by a more distinct and decided rigor than is observed in many cases of inflammation; the rigor is usually soon followed by much heat of surface; with the heat the patient experiences some affection of head, chest, or abdomen, and, indeed, frequently of all; there are vertigo on raising the head, pain, and some morbid impression on the mind, panting in the breathing, fluttering about the heart, with general hurry, irritability, and restlessness; the tongue is white and loaded; the alvine evacuations are morbid,—dark-coloured, fœtid, and scybalous,—or yellow like the yelk of egg,—or of the appearance of yeast; the urine is turbid and frequently deposits a copious sediment.

The affection of the head consists of the most acute pain, the greatest intolerance of light and sound, and

the severest form of vertigo, wakefulness, and distress, and sometimes even delirium, and the pupils of the eyes are often extremely contracted.

The affection of the chest is denoted by severe and acute local pain, which is apt to vary its situation, passing from one side to the other, or to the back, or occupying a situation higher up or lower down; this pain checks a deep inspiration, and even the ordinary breathing, to which it imparts a character of difficulty and anxiety.

When the abdomen is affected, there is acute pain, and great tenderness under pressure, in some part, or more or less generally diffused. The attack and situation of the pain is such, in some instances, that the case is with difficulty distinguished from gall-stones, though it more generally resembles peritonitis.

When the heart is the seat of this affection, there are violent and terrific attacks of palpitation, and the course of the carotids and even of the abdominal aorta, is sometimes the seat of violent pulsation or throbbing.

All these affections are apt to occur in sudden attacks, and to recur in paroxysms,—perhaps varying their form,—and exciting great alarm in the patient and his friends, who usually despatch a hurrying message to the medical attendants.

The preceding cases are sufficient to establish the fact that there are attacks which resemble inflamma-

tion of the head, chest, or abdomen, and yet are totally different in their nature. This fact is, of itself, highly important. And if I should fail in giving sufficient diagnostic marks of these morbid affections, it will still be of the utmost moment to know, that the distinction is absolutely essential to the adoption of an appropriate mode of treatment; and that whilst we appeal to future experience to render the diagnosis more complete, the peculiarities of each individual case must be carefully seized in order to supply the deficiency of general rules.

I would first observe that the attack of irritation, is in general, more sudden than that of inflammation, which is usually formed somewhat more gradually. This circumstance must therefore be cautiously inquired into, and may assist the diagnosis.

I believe, too, that the seizure in the former case is attended by more distinct rigor, and afterwards by greater heat, than in the latter.

The case of irritation affects, in a marked degree, more organs at once, than that of inflammation, which is usually confined, at first at least, to one.

The state of the tongue and the condition of the alvine evacuations are far more marked by disorder, and the latter are far more offensive, in attacks from irritation than in cases of inflammation.

The affection of the head from irritation comes on suddenly, is formed all at once, and is frequently attended by great restlessness, suffering, and distress,

and there is early syncope on taking blood. In arachnitis, the disease is usually formed somewhat more gradually; the patient has been subject to pain of the head perhaps for some days or even longer; he complains less; or at least there is less urgent distress,—less distress of a general kind; the pain may be very severe, although it is more frequently rather obscure; the intolerance of light and sound is less urgent; the rigor, and subsequent heat, and the attack in general is less marked; the patient is not so soon relieved by remedies, and the tongue and alvine evacuations are less morbid, and there is, especially, great tolerance of loss of blood. In the attack of affection of the head from irritation, the patient is relieved perhaps completely if the lancet be employed, but the attack soon recurs with equal or greater violence; in arachnitis, the relief is seldom so complete, the interval of ease so long, or the return so marked; the pain is diminished, perhaps, but gradually resumes its former violence, unless active measures be interposed.

When the chest is affected from irritation, the pain is severe and acute, and perhaps increased by a full inspiration; if the inspiration be repeated, however, a second and a third time, the increase of the pain is less and less; the situation of the pain varies; there is no cough, no crepitus on making a full expiration. In all these respects the case differs from inflammation. The remarks already made respecting the re-

lief from remedies, the effect of bloodletting, the tendency to a sudden recurrence of the pain, &c. in cases of affection of the head, apply equally here.

I had long remarked that there might be both acute pain and tenderness under pressure, of the abdomen, without inflammation; this state of things is frequently the result of intestinal irritation. It is distinguished from inflammation by the general symptoms of this affection, the mode of attack, the effects of remedies. In inflammation, the surface is usually cool, the head unaffected, the patient remarkably quiet; in the case of irritation, on the contrary, there is generally much heat after rigor, the head is much affected, and the patient is restless and generally distressed, the tongue loaded and perhaps swollen, the alvine evacuations extremely morbid, and great relief is obtained by the free operation of medicine.

I now proceed to notice some points in the history of this morbid affection. In doing this it will be impossible to avoid some slight repetitions of what has been already stated. But I think it will be of sufficient importance to give a connected view of the course of the affection, to render such repetition pardonable.

The attack generally takes place rather suddenly. It usually begins with severe rigor, which is succeeded by great heat of skin, and eventually by perspiration. With the rigor of heat, there is usually the accession of some severe local affection.

The changes in the course of the disease are, like the first attack, generally sudden. The patient is better and worse, and the most urgent messages are sent, at different times, to the medical attendant.

Generally the patient will be found to have been previously subject to disorders of the bowels; afterwards he is apt to experience similar attacks unless he be attentive to diet and regimen and to the state of the alvine evacuation.

Besides the circumstances already pointed out, there are some points of a very interesting nature which deserve to be particularly noticed in this place:—

1st. It must have fallen to the lot of many physicians to witness very severe morbid affections, immediately consequent upon causes which appeared totally inadequate to the production of such effects. A slight blow, or a trifling fall has appeared to induce serious and alarming indisposition. The truth is, that there was already a disordered and loaded state of the bowels,—dormant until roused into effect by the accident. A lady about fifty years of age, fell a few steps down stairs; she got up however and walked to the sofa; in a short time she was taken with chilliness, succeeded by heat of skin and the most intolerable pain of the head and sensibility to light, noise, &c. She soon recovered on taking active purges alternated with the ammoniacal anodyne draught.

2ndly. Every physician must also have observed cases of apparent inflammation, which did not pursue the usual course of inflammation, probably yielding sooner than is generally observed, or receding altogether, and recurring in paroxysms. This course of the disorder is noticed in several of the cases given in this section.

3rdly. The case is often relieved, perhaps, but obstinately refuses to yield to the lancet, recurring with great if not increased violence, in a manner not observed in cases of inflammation.

4thly. In other instances the local affection ceases,—perhaps for a day or two even,—and then recurs, only attacking some distant part. In these cases it has often been thought that there had been a metastasis of the former local affection, whilst, in fact, the cause of both remaining unremoved, has exerted its influence through a different channel of sympathy and upon another organ.

5thly. In the same manner we sometimes observe cases apparently involving inflammation of more vital organs than one, at the same time. Such cases may certainly occur. But it is my present object to show that appearances may be deceptive, and that the case may be different from inflammation, and dependent on a disorder remote from the parts affected.

6thly. In the last place, there have been many cases in which the expected traces of morbid anatomy,

—the effects of inflammation within the head, chest, or abdomen,—have been absent altogether. This observation has been fully illustrated, in regard to the brain, in the recent works of MM. Parent Duchatelet and Martinet,* and of M. Hebreart;† all these authors have noticed cases in which the symptoms of arachnitis existed, and yet not a trace of the effects of inflammation on dissection. The view which has been given of the effects of intestinal irritation may assist us in explaining an event which must have been witnessed by all who have in any degree pursued the study of morbid anatomy.‡

A most interesting and useful paper might be compiled upon this very subject.

The mode of treatment comprises the full evacuation of the stomach and of the bowels, soothing by anodynes, light nourishment, and certain local remedies.

Before I make a few observations on each of these measures, I wish, however, shortly to discuss the question,—ought we ever to have recourse to the lancet? If our diagnosis was early and certain, perhaps the lancet would never be required. But there are two reasons why it appears to me that,

* De l'Arachnitis, pp. 24, 25.

† Annuaire Med. Chir. See Dr. Johnson's Review, No. X. pp. 435, 438; see also No. VIII. p. 731.

‡ See further the Transactions of the College of Physicians, Vol. V. pp. 199, 255; Laennec, Abercrombie; and the Clinique Medicale of M Andral, Ed. I. Tom. IV. pp. 433, 442, 448, 457—459

whilst we must use this remedy with every precaution, it should not be entirely discarded, even in cases of intestinal irritation. First, that which was originally irritation merely, may doubtless lead to a state of inflammation; the presence of much disordered fæces in the bowels, may not only irritate, and induce pain of that, and of some remoter part, but may eventually induce inflammation, if long continued. Secondly, in the case of intestinal irritation the diagnosis may not, until the symptoms of the affection be still further studied, be such as to remove all doubt as to the nature of the case. It will then be prudent to bleed for the sake of safety, whilst we enforce the other and more specific modes of treatment.

Of the mode of using the lancet I propose to treat in the succeeding chapter.

I would particularly remark that the free evacuation of the stomach by vomiting has, in very many instances, afforded the most prompt relief. This important fact naturally suggests the propriety of administering an emetic.

The bowels must also be fully evacuated.

This alone, however, will not remove the symptoms of this distressing disorder, which appear to partly continue after the original cause is removed, from the irritation occasioned by the medicine, and from the state of purging themselves, and partly from the degree of lowness and exhaustion induced. To

remove these effects, the draught of tinctura opii and spiritus ammoniæ aromaticus, on one hand, and light and fluid nourishment, on the other, seem to be absolutely necessary. This remark is highly important, for I have frequently known the practitioner disappointed who depended upon any one of the remedies mentioned. It is by the judicious combination of all, that we must hope to subdue the present symptoms, and, what is of equal moment, to prevent their recurrence.

The local applications are chiefly a cold lotion applied to the head, a liniment applied to the chest, and a fomentation and liniment applied to the abdomen, when the pain occupies one or other of these parts.

As it is my principal wish to be as brief as possible, I have not deemed it necessary to enter more into detail respecting the various remedies to be employed. It is the objects which are to be attained which should be kept steadily in view. The same motive has especially induced me to give only such a number of cases as might be just sufficient to establish the facts and lead to reflection, whilst I reserve it for future opportunities to pursue the investigation. I shall have attained my object if I shall have impressed the profession with the truth that arachnitis, and other inflammations of important viscera, are sometimes stimulated by intestinal irritation, and that an accurate diagnosis of these affections is still required

in order that we may avoid dangerous measures, and adopt such as can alone cure the disease.

4. *Of Accidents and Operations.*

Another subject on which I would treat slightly in this place, is one of medical surgery, and relates to the treatment proper to be pursued after serious accidents and operations.

These cases must be considered at two distinct periods;—the first is that before, the second, that after, the accession of inflammation.

The condition of a patient immediately after an accident or operation, may be compared to that which succeeds to a shock of any kind. During what I have denominated the first stage after an accident or operation, the state of the patient greatly resembles that of irritation. The patient becomes affected with febrile and nervous symptoms, and there is great intolerance of loss of blood. In some cases there are even all the symptoms of irritation with that affection of the head which resembles arachnitis. Such a case is the following one which I extract from a recent very interesting essay on Green Tea, by Mr. Newnham.

"I was requested to visit Mrs. Whicher, of Petersfield, about the middle of October, 1819. She had been thrown from a gig, on the 15th of that month, and had suffered concussion of the brain, among

other serious, but less important injuries. She had remained in a state of insensibility for thirty-six hours, after which, delirium alternated with transient and fitful gleams of approaching reason. I found her on the 18th, delirious, her pulse hard and contracted, with an occasional feeble stroke almost amounting to intermission, her tongue furred and dry, her skin hot, and her bowels rather costive ; she was suffering from great pain in the head, exquisite intolerance of light, contracted pupil, injected conjunctiva, swollen palpebræ, and disposition to be drowsy ; nausea and vomiting were also present, though less severely so, than for the first two days after her accident. She was largely bled, very freely purged, and, in the evening, a number of leeches were applied.

" On the 19th, the appearance of the blood drawn on the preceding day, was buffy, and much cupped, with a proportionally large, and very firm crassamentum. Her pulse was hard, though more expanded than at my former visit ; the pain of the head was still exquisite ; there was the same intolerance of light, heat of skin, thirst, &c.—My patient was again bled largely ; faintness succeeded the operation, both on this, and on the former occasion. The blood drawn exhibited the same appearances, and she was continued upon a system of purgatives, and of the most rigid abstinence.

" On the 20th, Mrs. Whicher's delirium had in-

creased; the pain in her head was still intense, but her pulse was softer, and her skin moister; she had experienced less thirst, but, at intervals, since yesterday, had suffered a great deal from faintness. She was altogether in a very precarious state. She was now directed to take some strong green tea, with the view of arresting the inordinate action of the cerebral vessels, which still continued.

"At my visit on the 21st, I found my patient better; her headache was less severe, and she had much less intolerance of light; she conversed with me more rationally than before; her pulse was broader, fuller, and firmer, her tongue cleaner, the pupil more dilated, the conjunctiva clearer, and altogether she was much improved. I shall not continue to transcribe farther my notes of this case:—suffice it only to say that my patient continued improving, and in a short time I had the satisfaction of seeing this most valuable lady restored to her family and friends. I ought not, however, to omit stating, that, during all this time, the process of gestation was going on."

I am persuaded that there never was inflammation in this case. The symptoms on the 20th were of the same nature as on the 18th and 19th, and yet they were subdued by the green tea without further depletion. This could not have been the case, had there really been arachnitis. The fact of syncope having occurred from each of the bloodlettings, al-

though the quantity of blood drawn, and the posture of the patient, are not mentioned, is worthy of remark; as is also that of the conjunction of a continued state of deliquium with the symptoms of arachnitis.

Having laid this case with my opinion of it before an eminent surgeon in London, I was favoured with the following reply: "I agree with you entirely in the opinion that Mrs. Whicher's symptoms were entirely nervous, depending more on the state of the system before the accident, than on the accident itself." In fact this case is an interesting exemplification of the remark made, p. 199, that the cause of irritation is frequently dormant and inoperative, until it be excited into action by the occurrence of some shock to the system at large.

Another form of morbid affection arising from accidents or operations, is that of delirium. This state has been described by M. Dupuytren under the denomination of delirium traumaticum, and bears no slight analogy in its causes, symptoms, and means of cure, to some cases of puerperal delirium.

Still more frequently, however, there are local pains with fever; and the question is whether the case be of the nature of irritation, or of inflammation. In the former case, bloodletting is neither required nor borne; opiates, with a strict attention to the state of the bowels and the diet, are the most important remedies; in the latter, on the contrary, bloodletting

in its appropriate modes of application, is our principal means of cure.

This distinction will, I am persuaded, lead to a most material improvement, in the medical treatment of many cases of surgery. That bloodletting is not the appropriate or the tolerated remedy in the early stage after accidents or operations, is proved by a multitude of facts,—and by none in a more interesting manner than by the case given, p. 26, and the case so fully detailed, pp. 45—48. Similar facts would be found in regard to the state of patients after lithotomy and the other great operations of surgery, if the records of the art were carefully searched.

The facts to be borne in mind, are, that the immediate effect of an accident or operation is one of nervous exhaustion; that a secondary effect is a state of irritation; and that a third may be one of inflammation;—that there is intolerance of bloodletting during the state of irritation; and that bloodletting is not a preventive, although it be the cure of inflammation.

But it may be difficult to determine the limit between irritation and inflammation, and to ascertain, in individual cases, whether there be the first, or the second, of these affections. In such circumstances of doubt the rule for bloodletting which I have proposed becomes of great utility. The patient may be placed upright and be bled to incipient syncope. In mere irritation there is early syncope, and little blood

is lost, as little is required or would be borne to be lost; in inflammation, on the contrary, and precisely according to its degree, duration, severity, and extent, much blood flows before deliquium is experienced, and this is exactly what is required to subdue the disease, and is well supported by the actual condition of the system.

CHAPTER III.

ON THE DUE INSTITUTION OF BLOODLETTING.

It would be difficult to determine whether greater injury has risen in the practice of physic, from undue, or from inefficient bloodletting. To neglect the full use of this most important of our remedies, when it is required, or to institute it when it is not so, is equally to endanger the safety of the patient.

Much is said, in the present day, about bleeding boldly. This is frequently only another expression for bleeding rashly. Now, our modes of treatment should not be characterized by rashness, but by discrimination and by efficiency. Let us study the characters of diseases; and let us study the effects of loss of blood; we shall then be prepared to prescribe bloodletting, at once with energy and with safety, and with proportionate success.

It sometimes requires no little boldness to abstain from the use of the lancet.

Bloodletting is not only the most powerful and important, but the most generally used, of all our remedies. Scarcely a case of acute, or indeed of chronic disease, occurs, in which it does not become necessary to consider the propriety of having recourse to the

lancet, or to estimate the effects of bloodletting already instituted.

The question of the due institution of bloodletting, not only involves more serious consequences, but also more principles of the practice of physic, than any other. Every circumstance in the condition of the patient, in the nature of the disease, and in the effects of remedies, requires to be weighed with the utmost accuracy: for the neglect or misapplication of this remedy, or its inefficient or undue institution, or repetition, may allow the disease to acquire an overwhelming power, or plunge the patient into a hopeless state of exhaustion.

But the extreme complexity of this last question can only be properly estimated by reflecting upon the varied, nay, the innumerable, modes in which the three circumstances of the condition of the patient, the nature and character of the disease, and the effects of remedies, may be combined.

The circumstances of the constitution of the patient, and the effects of remedies being the same, each disease possesses, as I have already stated, its own peculiar power, or susceptibility, in regard to the effects of loss of blood, both immediate and remote.

This power and this susceptibility of the system in regard to the effects of loss of blood, may generally be determined by placing the patient very erect, perhaps with the eyes turned towards the ceiling, and

taking blood from a moderate sized orifice, until the first or slightest appearance of syncope be induced; the quantity of blood which thus flows denotes that power or that susceptibility respectively.

It then becomes a question whether the quantity of blood permitted to flow before the first appearance of approaching syncope is manifested, be the precise quantity which ought to be taken. I think it is so, with certain limitations, in the greatest number of cases, the power of the system being exactly in proportion to the necessity for bloodletting, and its susceptibilities, to the caution required in the administration of this remedy.

To trace these powers and susceptibilities of the system in regard to the effects of loss of blood, and to apply the facts so ascertained to the question of bloodletting in the cure of diseases, has been a principal object of investigation with me for a considerable period. I shall in this place, briefly illustrate these points by the cursory detail of three cases;—the first, a case of inflammation within the head; the second, of irritation resembling inflammation of the brain; and the third, of the latter affection in a patient labouring under disease of the hip-joint.

In the first of these cases, there were not very violent symptoms of inflammation of the encephalon. It occurred in the person of a medical gentleman; and the course of the disease, and the effects of the remedy, were remarked with great accuracy. The

symptoms were deep-seated pain, slight alteration of manner, slight intolerance of light, a natural pulse, a natural skin. I felt persuaded that there was inflammation. Besides the administration of other appropriate remedies, he was ordered to be placed upright in bed, and bled to slight syncope, on four successive days. The quantities of blood taken were eighteen, twenty-six, twenty-four, and twenty-two ounces respectively, leeches being applied in the intervals; they appeared so large, that the gentleman who performed the operation was, at each time, induced to desist from taking more, although syncope was never induced. It was only on the last blood-letting that slight syncope was observed. The patient recovered favourably, and promptly, without any of the symptoms of the remote effects of loss of blood.

The second case occurred in the wife of a medical friend, and was observed with equal accuracy and anxiety. The patient was a stouter person, and the symptoms far more violent, and so accurately resembled those of arachnitis as to lead to the conclusion that that was indeed the disease; there were violent throbbing pain, the utmost intolerance of light, great heat of skin, a very frequent pulse. Still I was persuaded that the case was sympathetic of intestinal irritation, and not inflammation. As this opinion, however, involved great difference in the treatment, it was not until I proposed to place the

patient upright and bleed to incipient syncope, that my friend's mind could be quite reconciled. It was then very obvious that there was something peculiar in the case. Complete syncope followed the abstraction of ten ounces of blood! On recovering from this syncope, the patient suffered as much as before. Diarrhœa occurred. The recovery was progressive though slow and marked by much exhaustion, on pursuing the usual remedies of irritation.

These simple facts prove the existence of two kinds of cases, similar in their symptoms, but altogether dissimilar in their nature and in their relation to the effects of loss of blood. Similar remarks may be made in regard to pleuritis and peritonitis, and affections resembling them but dependent upon irritation. The first protect the system from the effects of loss of blood, the second render it more susceptible to its influence than it is in a state of health. These facts, well substantiated, cannot fail to throw much light both upon the nature of these diseases and upon the due administration of bloodletting.

If irritation should supervene upon inflammation, the wonted susceptibility to the effects of loss of blood will, of course, be less observed. This fact is illustrated by the following case.

Miss ——, aged 20, had been affected during four years with disease of the hip-joint ascribed to a fall, the effects of which, at the time, confined her in a hospital during eight months; she sometimes suffer-

ed severely from pain, for which leeches, fomentations, &c. were applied; and she became pale and thin. During the last six months, there had also been attacks of pain in the region of her right kidney, which were usually relieved by passing gravel. In the midst of this state of things, Miss —— was, on March the 22nd, 1829, seized with pain of the head, and intolerance of light and of sound, together with more than usual pain of the hip and in the region of the kidney; the skin was hot, the tongue furred, the pulse 97; there had been some degree of vomiting, and the alvine evacuations were dark and offensive. Aperients were given.

These symptoms continued much the same on the 23rd and 24th, but on the 25th the affection of the head was greatly aggravated. Miss —— was placed in the erect posture and bled to incipient syncope; some delay was occasioned by the necessity for opening a second vein; it was found that forty ounces of blood had flowed. On the 26th, the headache and intolerance of light and noise were increased, and there was palpitation of the heart. These symptoms continued during the succeeding week.

I saw Miss ——, on the 3rd of April. It had been a question whether the case were inflammation within the head, or irritation. The symptoms were those of the latter; the quantity of blood which had flowed denoted the former. On a full examination of the case, I was persuaded, however, that the case

was one of irritation, and that the disease of the hip had enabled the system to bear a degree of loss of blood altogether unusual in this morbid affection. The result of the case proved the correctness of this opinion. Recovery took place without further blood-letting. I prescribed three grains of the submurias hydrargyri to be followed by an aperient draught.

On April the 4th and 5th, the pain of the head, and intolerance of light and sound, and the palpitation of the heart, were still very severe; the bowels had been moved, the evacuations being very black and lumpy; the mouth affected; the pulse 108.

On the 6th, Miss —— was better. On the 7th, she was still better, having less affection of the head and palpitation of the heart; the bowels had acted well, the evacuations improved in colour. A little pudding was taken.

On the 8th, Miss —— was still better, and was allowed a little meat.

On the 9th, it was found that Miss —— had imprudently sat up three or four hours on the day before, and she had become in every respect worse from this fatigue; there were greater intolerance of light and sound, more pain of the head and back, and palpitation. The diet was restricted to arrow-root in water. Her bowels were moved, and rest and quiet enjoined.

From this time Miss —— slowly recovered, losing the affection of the head, that of the hip remaining.

The bowels were obstinate; and there were much paleness and debility.

There cannot be a more interesting illustration of the principle which I have laid down, than the following case which I extract from Mr. Lawrence's lecture on inflammation, as reported in the Lancet, No. 325, p. 270. It is given by that distinguished surgeon as an illustration of the advantage of one ample bloodletting, over several smaller ones. But it also illustrates, in the most striking manner, the influence of inflammation in rendering the system capable of bearing the loss of bloodletting.

Mr. Lawrence observes, "Some years ago I had occasion to attend a young female—a slender young girl, in a serious attack of inflammation in the chest. I bled her not very sparingly, and adopted other antiphlogistic treatment, but I found it necessary to repeat the bleeding several times; and after a considerable number of bleedings, the inflammation was not yet satisfactorily reduced. The symptoms of inflammatory disorder in the chest continued, and I deemed the patient in danger. Still her circulation was reduced to that state in which I could not take more blood from her. I then resorted to the use of digitalis—nearly poisoned her with it, I believe—(laughter); however, through the means I used, or in consequence of her possessing a pretty good constitution, she recovered. It happened two or three years afterwards, that I had occasion to treat her

again for a complaint of this kind. She was a servant in a public institution with which I am connected, and I was requested to see her, having been accidentally at the establishment. I had previously seen her in the course of the week before this occurred. She had wanted a tooth taken out, which I removed for her, and that was attended with a great deal of swelling about the jaw and throat, so that I found it necessary to apply leeches to the parts. By the end of the week, I was called to see her, and I found her labouring under symptoms of the highest degree of inflammation of the chest. Though she had been attacked only two or three hours when I saw her, the symptoms were very severe; there was excessive pain, so that she could hardly command her breathing; flushing, and great heat over the whole body; white tongue, and a highly disturbed state of the pulse, full, strong, and very frequent; I never saw symptoms proceed to so great a degree in so short a time. The case was very favourable, I thought, for trying depletion to a great extent, I therefore bound up her arm and bled her; she was a rather slender weakish young woman, as I have already said. The blood spouted out most vigorously from the vein of the arm. I had got a good large vessel; it ran into it famously; and really, in cases of inflammation, where the blood runs freely out of the vein, I generally let it run on till it stops (laughter), for that seems to me to be the only

way of doing good, and I fully intended to have gone on till this young woman fainted; but to my astonishment, though I had taken away an enormous quantity, she did not faint, and still the blood ran out in a vigorous stream into the vessel, without touching the surface of the arm, to the last. In the end I stopped it, because the quantity did seem to me to be so very great. I had the blood weighed afterwards, and it weighed three pounds; that is eight and forty ounces! I believe it was an ounce or two more; however, it was not less, and yet that evacuation did not make that young woman faint. Now, that single venesection cured her; she was well from that time; all the symptoms were removed; she had no further symptoms whatever indicating inflammation of the chest. She kept very quiet for two or three days, took opening medicines, and was restricted to a low diet; but really I may say she required no further treatment but that single venesection."

To this case I would add the following account of three others, by my friend Mr. Warry.

The first is a case of pleuritis. The second illustrates the protective influence of laryngitis in regard to the effects of loss of blood; the third, the contrary tendency of irritation. Laryngitis forms an exception to the rule relative to inflammation of mucous membranes. The case of irritation resem-

bled peritonitis, but the patient bore bloodletting ill, and was not benefited by it.

My dear Sir,

Having read with much interest your paper on 'The investigation of the due administration of Bloodletting;' and knowing that you are at the present moment engaged in preparing for publication some further remarks on that interesting subject, I send you three cases selected from some which have come under my notice, which I think illustrate the subject, and of which I beg you will make use in any way you may judge proper.

I am, dear Sir,

Sincerely yours,

E. T. Warry.

84, Gower-Street, Bedford-Square,
Nov. 30, 1829.

"John Filser, aged 40, a short healthy countryman, applied for advice on the 27th of March, 1826; he complained of pain in the left side, which was increased on his attempting to inspire, said he has been subject to inflammation of the lungs, and had always been obliged to be bled for it. The symptoms were not very urgent, I therefore took only fifteen ounces of blood, which afforded him very trifling relief; I gave him a purgative, and desired to hear from him on the following morning.

"On the 28th, he was enabled to walk with the greatest difficulty about half a mile to see me; he said the pain was exceedingly increased, and he could not make the slightest attempt at inspiration. I again bled him, sitting in the upright posture in a chair, from a very large orifice; forty-four ounces flowed before either relief or syncope was produced. The blood was drawn in seven different cups, each of which the patient held himself, during the operation; by the time he had lost forty-eight ounces, he was in a state of syncope, from which, however, he soon recovered; the pain had entirely left him, and he was enabled to inspire as freely as usual; I did not see him again. The blood was lost in about three or four minutes, the last twenty ounces being considerably buffed and cupped, that first drawn not at all so."

"I was sent for to see Henry Bawden, aged 50, on August 18th, 1825, at eleven a. m. On my arrival I found him in bed, lying on his back with his shoulders and head raised, breathing with great difficulty, and affected with an uneasy sensation of dryness in the larynx, with a voice extremely hoarse, and reduced to a scarcely audible whisper; his pulse was full and strong, and 86 in a minute; there was considerable thirst; added to the affection of the larynx, he complained of an obtuse pain at the scrobiculus cordis extending to the right side, which was much increased on making a full inspi-

ration; I immediately opened a vein in the right arm, and took thirty-five ounces of blood, the patient being in a recumbent position, receiving it in six distinct tea-cups. This did not produce the least faintness; the blood was very much buffed and cupped. Saline medicine with the tartras antimonii was given every four hours.

"On the 18th, at seven p. m. I again saw him, and considered it necessary that the bleeding should be repeated; this was accordingly done to the extent of twenty-five ounces without producing faintness. The same medicines were directed for him with an opiate at bed-time.

"On the 19th, at 8 a. m. I again bled him; and when I had taken about fifteen ounces of blood he became pale and sick, a profuse perspiration broke out over the whole body, and for the first time complete syncope was produced.

"On the 20th, he was much better, twenty leeches were applied to his throat, and after them a blister; no further depletion was necessary; the patient did well, and recovered perfectly."

"Elizabeth Smith, aged 18, having been much out of health during two months, was admitted into Bartholomew's Hospital, on Oct. the 29th, 1826, complaining of violent pain across the abdomen, augmented on pressure; the breathing hurried, the pulse 110 and hard, the bowels confined, the fæces dark and offensive. She was placed in bed and

bled from the arm, and although in the recumbent posture, she fainted when ℥xii. of blood had been taken.

"On the 30th, the pain continued unabated; she was again bled in the recumbent position; and syncope occurred when ℥xiv. had flowed. Forty drops of the tinctura opii were given immediately after the bleeding.

"On the 31st, ℥xv. of blood were taken, in the same manner, and with the same effect, and twenty leeches were applied. On Nov. the 1st, thirty leeches were applied. On the 3rd, the pain and tenderness of the bowels were increased, the pulse hard and 115; ℥xii. of blood were taken, and syncope was again produced; and ℥viii. were drawn from the loins by cupping. Still the pain was unabated on the 7th, and she had become extremely feeble; the pulse was 130; the retina had become acutely sensitive to light; the extremities cold, and the legs swollen; and the urine was limpid, and sometimes passed involuntarily.

"She now took the extractum conii at bed-time, and with great relief, the pain of the bowels becoming greatly diminished. This relief continued for six or seven days. The pain then returned, and eventually, the patient left the hospital little benefited."

There is a fact which calls for caution in reference to bloodletting in these cases. Many of the uneasy symptoms induced by the loss of blood are relieved by

having recourse to the lancet, and we might thus be betrayed into a dangerous recurrence to this remedy.* Many of these symptoms are produced by the effort made by the system in its reaction; to take blood subdues the reaction for a time, substitutes a tendency to syncope in its place, and consequently relieves the uneasy symptoms; but the reaction recurs with augmented violence, if the strength of the system be still good, or, it may be that a state of sinking, or even sudden death may be the issue.

It would be proper in this place to adduce a series of observations on the effects and issue of bloodletting in different diseases. For the present, however, I must be content to present the reader with the general results of my investigation. It would require many years to collect such a series of facts as would be accurate and complete. But I hope, by continued attention to the subject, to effect this desirable object eventually.

It is a remarkable fact, already noticed, that the diseases which most require the use of the lancet, are precisely those which best bear the loss of blood."† They may be enumerated in the following order:—I. Diseases within the head, especially apoplexy, shortly before, and early after, the attack; and inflammation. II. Inflammation: 1. of the serous membranes; 2. of the parenchymatous substance of

* See p. 66. † See p. 152.

various organs; 3. of the mucous membranes. III. Fever, and its complications. IV. Irritation: 1. of the brain, resembling arachnitis; 2. of the chest,—of the abdomen, &c.

In the last class of morbid affections, in which it may be a question whether bloodletting be required or not, the loss of blood induces early syncope. And in those affections of the head and heart, which arise from loss of blood, in which further bloodletting would not be unattended by risk, there is still earlier deliquium on attempting to use the lancet.

I may add that acute anasarca must be arranged with those diseases which require and bear large depletion; whilst dyspepsia and chlorosis assimilate more with irritation and reaction from loss of blood.

1. *Of Early Bloodletting.*

Some medical writers have attempted to fix and to limit the dates at which it is proper to institute bloodletting. To do this really, is utterly impossible.

Most diseases may, indeed, be divided into the stages, 1. of accession; 2. of full developement; 3. of disorganization of the part or parts affected; and 4. of deterioration or failure of the powers of the general system. It is very essential to bear this view in mind, whenever we may be required to determine the question of bloodletting. It will guide us far better than days or dates. If the disease be

formed, and not merely expected, the earlier the lancet is used the better. If it be fully developed, bloodletting is still more required, and even better borne. It is when disorganization is great, and the powers of the system are shaken, that it requires the utmost caution and skill to conduct the treatment of the case.

Early in the disease, a single bloodletting to syncope will often prove sufficient for the cure. If this remedy be employed later, it will usually be necessary, and safe, to repeat it.

The first stage of apoplexy is that which precedes the attack. The attack itself is frequently one of disorganization. On this, failure of the functions and powers of life, speedily follows. In the first stage a single bloodletting to syncope, always a large one, perfectly relieves; in the second, bloodletting is neither so well borne nor so efficacious; it must be repeated, and it must be conjoined with the local abstraction of blood and other remedies.

In arachnitis an early bloodletting to syncope, also always a large one, is frequently equally efficacious; but if the disease has become fixed by delay, it will always be necessary to repeat the remedy, perhaps several times.

In pleuritis and pneumonia one early bloodletting to syncope frequently subdues the disease entirely. At a later period, it is usually necessary to repeat the bloodletting.

In peritonitis, especially if the intestines be involved in the disease, it is very essential to observe that the feet are warm before the rule respecting bloodletting is adopted; otherwise syncope may take place before the due quantity of blood is taken.

In bronchitis and in dysentery, bloodletting is neither so well borne, nor so efficacious, although instituted early, as in pleuritis or peritonitis. Laryngitis constitutes an exception to this remark as extended to the inflammation of the mucous membranes in general; in this case it is probable that the brain suffers from the impeded respiration.

Early bloodletting is of the utmost service in fevers. It may be a question whether this remedy be proper in irritation, but I incline to recommend one early use of the lancet. In the reaction from loss of blood the topical application of leeches, or of cupping, is frequently of great service; general bloodletting is of course excluded.

Having thus stated and illustrated the general principle proposed to guide us in the due use, measure, and limitation of bloodletting, I proceed to speak of this remedy in its first institution and in its repetitions.

2. *Of a First Bloodletting.*

The necessity and propriety of a first bloodletting must be determined by the diagnosis of the disease, and by a due estimation of the powers of the patient.

In the case of inflammation no one would think of trusting the safety of the patient to any other remedy than bloodletting. And in the case of irritation, bloodletting although a subsidiary, may still be a useful remedy.

The propriety of the measure having been thus determined, the next question is that of the due and proper mode of its administration. What quantity of blood should be taken? This question must involve the consideration of the nature, stage, and degree of severity of the disease, and of the strength, and the greater or less power or susceptibility in regard to the effects of loss of blood, of the patient. How difficult must it frequently be, accurately to determine these points! This can only be done, in many cases, indeed, by watching the effects of the loss of blood as it flows. And yet the usual mode of proceeding, is to prescribe the quantity of blood to be drawn, and forthwith to leave the patient in the hands of one from whom, however competent, the right, or at least the freedom, of judgment is thus preposterously taken.

It was with the view of accurately suiting the remedy to the individual case, that I was led to devise a rule for the administration of bloodletting, which should at once involve within itself a due regard to all the circumstances which I have mentioned. This rule, as I have already observed, consists in placing the patient perfectly erect, in making

a moderate sized orifice into the vein, and in allowing the blood to flow until incipient syncope occurs.

If the case be one of inflammation, much blood will flow without inducing syncope, and the quantity will be precisely in proportion to the degree of severity, and in relation to the seat of the disease; in a word, to the exigency of the case.

If the case be one of irritation, the quantity of blood which will flow before syncope is perceived, will be, as it ought to be, very small.

In the case of reaction from loss of blood, syncope will occur on the abstraction of a still smaller additional quantity of the vital fluid.

If the patient be robust, a proportionately greater quantity of blood will flow without inducing syncope, than if he be feeble. The same remark may be extended to any peculiarities of constitution, as plethora on one hand, or corpulency on the other; in the former case a greater, and in the latter, a less detraction of blood, will lead to a state of syncope.

The administration of the remedy is thus accurately suited to the nature and degree of severity of the disease, and to the powers or susceptibilities of the patient.

And thus the quantity of blood which has flowed becomes, in its turn, accurately diagnostic of the nature of the morbid affection, demonstrative of the powers and susceptibilities of the patient, and, taken in conjunction with other circumstances, indicative

of the propriety or safety of the further detraction of blood, but especially of the degree of necessity which exists for revisiting the patient very early.

It is remarkable, too, that this rule is accurately adapted to those mixed cases, which, although unnoticed by nosologists, are by far the most frequent occurrences in actual practice. As inflammation predominates over irritation, or irritation over inflammation; or as exhaustion from loss of blood, or incipient failure of the powers of the system, may be supervening to either of these morbid states, so will the quantity of blood drawn be greater or less.

It may be proper, in this place, to add a few words in regard to limitations and exceptions to the rule for bloodletting just proposed.

In recommending the adoption of this rule, I must suppose that the case is such as to require, and the strength of the patient such as to bear, the full effect of the detraction of blood. In any other case, it may be proper, perhaps, to adopt some other mode of proceeding.

The case of inflammation may be so mild as not to require a full bloodletting; or it may be chronic, and general bloodletting may be inappropriate; or the powers of the patient may be so low that the mere assumption of the erect position may lead to syncope. How far general bloodletting is required in the case last mentioned I do not pretend to deter-

mine; but I confess that I think the topical remedy most appropriate.

But in acute cases, in persons whose strength is not altogether impaired, I think nothing short of the plan I have proposed, can be esteemed efficient, or can be expected to be efficacious.

One apparent exception to this rule exists where there is, besides the affection of the head, for instance, arising from irritation, inflammation of some part. An example of this kind, already detailed, p. 214, presented itself in the case of a young person affected with chronic inflammation of the hip-joint. Symptoms of irritation, affecting the head chiefly, came on. She was bled, and lost a large quantity of blood before syncope was induced, although she was of a feeble constitution.

I would in this place again caution the reader, in regard to the case of irritation, not to have unnecessary recourse to the lancet. This caution is obviously still more necessary in regard to exhaustion from loss of blood.

But a caution of this kind is peculiarly necessary in the case of sinking of the vital powers. This case is frequently very insidious in its accession and in its character. Bloodletting is sometimes suggested by a complaint of oppression in the breathing. The pulse does not indicate such extreme danger. In such a moment, the detraction of a small quantity of

blood, an evacuation of the bowels, and even a trifling effort, has led to immediate dissolution.

There are doubtless still many questions and cautions in regard to bloodletting, requiring renewed investigation, and the test of further experience. For example, is it ever, and in what cases, dangerous to place the patient upright, and bleed to incipient syncope, admitting that general bloodletting is required at all? Is it ever, and in what cases, right and safe to carry the bloodletting beyond the point of incipient syncope? Is it ever, and in what cases, safe and proper to place the patient in a more or less recumbent posture, and bleed to syncope? And, lastly, is it ever, and in what cases, advisable to make a less or greater orifice than that which I have denominated 'of a moderate size' into the vein,—so as to allow more or less blood to flow before syncope is induced?—it is obvious that the orifice into the vein may be so large as to induce syncope before the required quantity of blood has been taken; or it may be so small as to act as a sort of drain, and allow of the flow of an undue quantity of blood.

It has been observed by several writers that reaction is very apt to follow bloodletting which has been carried to syncope; and this fact has been urged as an argument against the practice. I am persuaded, however, that this will rarely be observed in cases in which the precaution has been observed of bleeding the patient from a good sized orifice, and

in the erect position; and that, even in the cases in which it does occur, it will be of little consequence, except as an indication against the further use of the lancet.

I think, indeed, that there would be danger in bleeding to actual syncope in the case in which the blood flows very slowly; and especially in that in which, from this cause, it becomes necessary to open a second vein. Much more blood flows in such a case before syncope is observed, than when the blood pours forth in an ample stream, and more, I think, than can always be borne with impunity or safety.

Another circumstance requires attention. It must be carefully seen that the patient's feet are warm. Otherwise less blood may flow in inducing syncope, than will be required to subdue the disease.

3. *Of the Repetition of the Bloodletting.*

In determining the question of the propriety of a repetition of bloodletting, many circumstances require to be considered. But I would remark, in the first place, that if much blood have flowed at the first bloodletting, it must be taken as indicating the necessity for an early repetition of our visit at least; for it will also, unless the symptoms shall have been greatly subdued by it, indicate the necessity for a prompt repetition of the remedy.

I would take this opportunity of observing, that

little reliance is, in my opinion, to be placed on the appearance of buff upon the blood. I have no doubt that this appearance is induced by inflammation ; but I am also convinced that it is induced by irritation, and even by the reaction which attends exhaustion from loss of blood. I knew one patient greatly injured, and another, I believe, destroyed, by confiding to this appearance of the blood, as an indication for the further use of bloodletting.

If the quantity of blood taken has been great, if the symptoms of the disease are neither subdued nor declining, I cannot hesitate, judging from much attention to the subject, to recommend an early repetition of the bloodletting, conducted precisely in the same manner as before.

Of course the same observations will apply to a third, fourth, or fifth, or any subsequent repetition of the remedy. Generally speaking, as long as bloodletting is required, it can be borne ; and as long as it can be borne, it is required. Nothing less than the most ample bloodletting can be trusted to for the cure of inflammation ; as long as there is inflammation, much blood will flow before syncope is induced. Copious bloodletting is unsafe in irritation, and, a fortiori, in exhaustion from loss of blood, however great the reaction ; but in these cases syncope is early induced on opening a vein, the patient being raised into the erect posture. Indeed, this rule appears to me to be, in every case, most efficient,

most safe. And it has the advantage, not only of proportioning the quantity of blood taken to the precise exigencies of the case and powers of the patient, and of denoting the necessity for its early repetition, for which objects it was first devised; but by involving the circumstance of syncope itself, it implies the necessary superinduction of that state which constitutes a great part of its efficacy.

Thus the rule is as applicable to the case of repetition, as to that of the first institution of the bloodletting. If much blood have been already taken, proportionably less will flow, cæteris paribus, before fainting occurs. Yet if the disease shall, in the mean time, have become augmented in severity, it will require the detraction of a proportionably greater quantity of blood to produce syncope. This principle frequently explains the fact, that a second, or even a third, bloodletting is frequently better borne than the first; the inflammatory action is become more established—influences the system more.

In the cases in which the patient does bear a second bloodletting better than the first, it becomes an inquiry, whether this arises from there being less nervousness about the operation, or from the continuance of the disease, or from other circumstances, as a different state of the feet, and of the surface generally, as to temperature.

It is certainly true that the duration of inflammation influences the system in its powers of bearing

loss of blood; the longer the disease has subsisted, unless the morbid changes are great, or the strength has begun to be worn, the better bloodletttng is borne.

A young farmer, aged twenty-one, was attacked with pneumonia. On the second day of the disease, it was proposed to bleed him. He was alarmed and agitated, and reluctantly consented to the operation. When four ounces of blood had flowed from the vein, he fainted completely. On each of the two succeeding days, he lost fifteen ounces of blood, sitting in the erect position, without the least approach to syncope, and with effectual relief.

My friend, Mr. Toogood, of Bridgewater, to whom I am indebted for this interesting case, observes, "I have no doubt that the fainting on the first bloodletting was caused by apprehension. I have very frequently remarked, that patients have soon fainted on being bled for the first time, who have borne large and repeated bleedings very well afterwards."

I should imagine, too, that young and raw farmers were not the most likely persons to be brave and firm under a surgical operation however trifling. The following case is interesting in the same point of view.

Ann ——, aged 22, complained for two years of pain in the hip, increased by pressure on the anterior part of the joint, or by striking the knee. There were also tenderness, fulness, and hardness, about

the region of the liver; the pulse being frequent, the tongue white, with its papillæ raised and broad; the bowels confined; and the skin dry, and sometimes hot.

She was bled in the erect position, and on losing about two ounces of blood she became frightened and pale, and fainted completely. She soon recovered however, and the blood was then suffered to flow till she had lost about eighteen ounces of blood, and she did not faint a second time.

4. *Of Bloodletting as a Preventive of Inflammation.*

I now come to a point of the utmost moment. I will suppose that the preceding bloodletting, or bloodlettings, have subdued the symptoms of the disease. It has frequently been proposed to repeat the remedy by way of preventive and security against a return of these symptoms. Of all the cases in which bloodletting has been instituted, none is so replete with danger!

In the first place, the powers of the patient have been subdued; in the second place, the case is one of pure exhaustion,—the state of inflammation which was before protective of the system against the effects of loss of blood, having been removed. At such a period the symptoms of exhaustion with or without reaction, are very apt to supervene without any

further loss of blood. But actual bloodletting at such a moment, has often issued in an irremediable state of sinking.*

There is thus extreme danger from further bloodletting in such a case. And indeed such instances of bloodletting constitute a considerable proportion of those disastrous events from the use of the lancet, of which we occasionally hear.

I may observe incidentally here, that the presence of inflammation has such a decided influence in enabling the system to support the loss of blood, that I have sometimes had an idea that, in the case of sinking, the patient might possibly be saved by inducing inflammation. But in fact, the state of sinking appears almost to preclude the existence of inflammation, as we may learn from observing the inaction of the strongest blisters applied in such circumstances. So that a state of inflammation and of sinking, and I think I might say, of reaction from exhaustion, appear to be in a certain degree incompatible with each other.

I have already noticed the peculiar condition of the system, soon after serious accidents or operations. Even in these cases bloodletting is not to be resorted to as a preventive of inflammation. This remedy is neither required nor well borne in such circumstances, and other remedies are imperatively called for, just

* See the Commentaries on some Diseases of Females, p. 286.

as bloodletting is the remedy for inflammation actually established. Symptoms of exhaustion, with or without reaction, are very apt to supervene without loss of blood, especially in the aged. This point has been noticed in an interesting manner by Mr. Lawrence, as reported in the Medical Gazette, No. 100, p. 159. But bloodletting in such a case has often issued in immediate sinking.

Cases of lithotomy, and of fractured ribs are, in fact, for a certain length of time cases of irritation and not of inflammation. Afterwards they become cases of inflammation, but this morbid process is not set up instantaneously; and until this event do take place, very moderate bloodletting may be proper,—but remedies of a different class are imperatively required; the bowels, and the diet must be regulated, and anodynes and frequently cordials must be administered.

5. *Of late Bloodletting.*

Of all the circumstances under which the physician may be called to his patient, none is more distressing, none more puzzling, than that of neglected inflammation. The morbid changes produced in the part affected, and the devastations in the powers of the system, may be so great, that bloodletting would be unavailing, if it could be borne, and could not be borne, if it would be availing. In such cases the

powers are to be sustained whilst the disease is intrusted to other remedies.

6. *Of Local Bloodletting.*

Local bloodletting is to be viewed in three points of light. First, it is useful as an auxiliary to general bloodletting, in cases of inflammation: secondly, it is proper in some cases of itritation, in which general bloodletting could not be borne: and, thirdly, it may be required in cases of exhaustion with reaction and affection of the head, in which general bloodletting would be injurious or even fatal.

When, in cases of inflammation, syncope has been induced by general bloodletting, it may still be necessary to employ cupping or leeches. These remedies are especially and peculiarly efficacious in such a subdued state of the system, and their prompt and timely use, at this moment, may obviate the necessity for a repetition of the general bloodletting, and thus the powers of the system will be husbanded. But delay will deprive the local remedy of great part of its efficacy. Such delay will therefore only be proper, when very early syncope has been produced by the general bloodletting, indicating a very low state of the disease, or of the vital powers.

I think it will rarely be necessary to repeat the general bloodletting in cases of irritation. Topical bloodletting is, generally, both more appropriate and

more efficacious, if a first use of the lancet have not subdued the local affection. Indeed it may be a question whether the topical is not in most cases of this affection, to be preferred to the general remedy. For the symptoms of irritation are very apt to be superseded by those of exhaustion.

But in the case of exhaustion from loss of blood itself, it may still be necessary to apply the topical remedy. It has already been noticed that such a state is not only not incompatible with repletion and a tendency to effusion within the head, but that it actually supposes that condition of the encephalon, if long protracted. In this case further general depletion would be obviously attended with great danger. Topical bloodletting, may, however, be required for the local congestion.

It is remarkable, in this case, how small a quantity of blood taken, will relieve the patient. Two or three leeches, even, are sometimes sufficient; half a dozen are an ample number. If cupping be employed, the early relief obtained will denote the proper quantity of blood which should be allowed to flow. In the interesting case of this kind given by Mr. Hey in his treatise on puerperal fever,* the abstraction of so small a quantity as three ounces of blood, from the temporal artery, on two successive days, afforded complete relief.

* See above, p. 68.

Together with topical bloodletting, such measures must frequently be adopted as may restore the powers of the general system. These remedies are by no means incompatible with each other. Each, alone, will relieve; but it is when duly combined, that their efficacy is most manifested.

Before I finally dismiss the subject of topical bloodletting, I would just intimate, that I believe that the application of leeches to parts covered by the bed-clothes, and followed, as is not unusual, by that of a bread poultice, sometimes issues in the detraction of a quantity of blood scarcely suspected. I have known the patient inundated by the blood thus flowing from a dozen leech-bites upon the abdomen, and affected by the most fearful symptoms of exhaustion.

CHAPTER IV.

OF BLOODLETTING IN INFANCY AND CHILDHOOD.

Not the least interesting application of the rule which I have proposed, to guide and govern us in the use of bloodletting, is its use in the treatment of the diseases of infancy and childhood. This tender age is far more liable than later years, both to the insidious, and the sudden, fatal effects of loss of blood; it therefore requires to be viewed with still greater care and watchfulness.

The modes of general bloodletting employed in infancy and childhood are, leeching, cupping, and venesection.

I must first, once for all, protest against the usual plan of applying leeches in infancy, and allowing the bites to continue to bleed. Nothing can be more indefinite—nothing more replete with danger. Most of all it is dangerous to apply leeches late at night; the bleeding may go on unobserved and unsuspected, and precipitate the little patient into a state of irremediable sinking.

The proper mode of abstracting blood in infants or children, whether by leeches, cupping, or vene-

section, is to place the little patient upright, and watch the countenance. On the very first indication of pallor, or faintishness, the flow of blood must be stopped.* For this purpose the leeches, or the cupping-glasses, are to be removed, or the vein secured.

The effect of exhaustion in infants and children are seen chiefly under three forms; 1. that of irritability; 2. that of stupor; and 3. that of convulsions.

Of the state of irritability the following case, though too briefly sketched, presents an interesting example.

A little patient was reduced by too copious and repeated bleeding for croup. There supervened a state of irritability of temper, so that, when greatly exhausted, it made great efforts to bite, scratch, and beat its attendant. This state of agitation continued until the powers of life were gradually exhausted.

The state of irritability frequently, though not always, leads to that of stupor. Of the latter I have given so many instances in Appendix II. to Part First, that it appears unnecessary to add more here. Yet I cannot refrain from inserting the following interesting account from my friend Mr. Cox, Surgeon, Montague-Square, relating as it does, not only to the symptoms of exhaustion, but to the use of bloodletting.

* This may be done in the case of a leech-bite, or of venesection, if necessary, by taking up a small portion of the integuments by a mere stitch with a needle and silk.

My dear Sir,

The subject you are now illustrating is of so important and interesting a character, and the examples you have already given in your tract are so striking, that it hardly needs any fresh case to confirm the truth of your statements. The state of exhaustion from loss of blood was most strongly marked in the case of my little boy. At five months old he was one of the strongest and most vigorous infants I ever saw; between that and the age of six months, he was attacked on a Sunday with croup of a highly inflammatory character, which was relieved by the application of six leeches to the throat, and calomel and ipecacuanha given every three hours. On the succeeding day (Monday) he was so much better that I had the greatest hopes that the disease was vanquished; but in the night of Monday he was attacked with symptoms of inflammation of the lungs of the most violent character, which were relieved only by the application of leeches, repeated with the interval of a few hours only, till faintness was produced; this was sustained by frequent doses of the tinctures of colchium and squill; the symptoms of inflammation of the chest were thus relieved, but I need scarcely tell you, that these were succeeded by a state of exhaustion, which was extreme, and resembled hydrencephalus in many of its characteristics. There was a quick irritable pulse, dilated pupil, insensibility, &c. &c. Although

the inflammation had been of so serious a character, that it appeared to my friend Dr. Bernard, of Clifton, and myself, that none but the most active means would save the life of the child; yet they were employed by myself, anxiously watching for an impression on the disease, and as soon as the breathing became less distressing, and faintness was produced, and the pulse was less strong, hard and vibrating, the depleting means were gradually withdrawn. The state of exhaustion I have described supervened, and although many symptoms stimulated an affection of the head, I was enabled to remove them by gentle stimulants. Had the symptoms of oppression of the brain been met by further depletion, I can have no doubt that the result would have been fatal. He had repeated attacks of croup and inflammation of the lungs during dentition, but he is now a strong healthy boy.

I am,

My dear Sir,

Yours, very faithfully,

J. C. Cox.

33, Montague-Square,
November 21, 1829.

On the subject of convulsions as arising from exhaustion, I cannot do better than refer to various parts of the interesting treatise on this subject by

Mr. North,* but especially to pp. 101, et seq. and pp. 202, et seq. Mr. North observes, at p. 101—"A plethoric state of constitution increases the natural aptitude of the child for convulsions. But we must guard against being influenced by an erroneous opinion which is very general. There are many practitioners, and some of no mean celebrity, who assume, that in every case of convulsions there is either a local or general increase of the actions of the arterial system, which demands for its relief the abstraction of blood. It is, therefore, the more necessary to insist upon the frequent occurrence of convulsions from debilitating causes, and from a state of nervous irritability without any vascular excitement either local or general." And at p. 280,—"I am also of opinion that children are not unfrequently bled and purged for the purpose of relieving great irritability, when much advantage might be gained by the judicious application of sedatives, under restrictions to which I have before adverted." Mr. North's work is full of remarks of the same character, and of the utmost importance and practical utility.

Similar remarks apply to children and adults, in regard to the various powers and susceptibilities of the system to the effects of loss of blood, under the influence of different diseases. In affections of the head, in inflammatory affections, there is great power;

* Practical Observations on the Convulsions of Infants; by John North, 1826.

in cases of irritation, and, still more, of exhaustion, there is great susceptibility.

It will be obvious from this remark, that the various attempts to state the quantities of blood, which may be taken from children, in their several ages, must have proceeded upon the most vague conjectures. This is further proved by the very various statements made upon this very point by various writers. In fact, were such a scale made, it must be made distinctly for every disease, in reference to every age. Something of this kind, I hope to effect, with the other objects already pointed out, in the course of my continued investigation of the effects of loss of blood. But it will be obvious that this can only be done by long and uninterrupted attention to the subject.

I have, however, already observed sufficiently to be enabled to recommend that, in every case of general bloodletting, whether by leeches, cupping, or the lancet, the little patient be supported in the erect position, its countenance carefully watched, and the flow of blood arrested on the very first appearance of pallor.

The quantity of blood which thus flows will vary with the character of the disease, precisely as I have described in relation to adults;

The boundary which it would be dangerous to pass, is accurately fixed;

And the result observed becomes accurately diagnostic of the character of the disease.

It will be observed that I esteem the application of leeches and of cupping, in infancy, as a mode of general bloodletting, as well as the use of the lancet. The precise number of leeches applied will regulate the rapidity of the detraction of the blood; their prompt removal, and the immediate closure of the leech-bites, must be effected, on observing that the system is brought under the influence of loss of blood. The same observation applies to cupping, and, a fortiori, to the lancet.

I am persuaded that this view of the subject, simple as it is, will reflect a new and important light upon the whole subject of the nature and treatment of the diseases of infants and children.

CONCLUSION.

By the Table, inserted at page 155, and by the aid of my medical friends, I hope to collect, in a moderate space of time, a body of valuable facts, to confirm the practical safety and utility of the rule for bloodletting which I have proposed, or to ascertain the various exceptions and limitations to it which may occur in practice. Meantime, I trust the rule itself will prove that guide and guard in the use of the lancet which has been so long, and I think, particularly lately, so imperatively required.

There are, I am persuaded, few cases in which, if the measure be proper at all, bloodletting will be carried too far if the rule proposed be strictly adopted ; whilst the fullest effect upon the system is effectually and safely secured, and, in the case of absolute syncope suddenly supervening, the remedy is at hand, in the immediate change of posture from the erect to the recumbent.

I would still add one further remark. It is that the effect of bloodletting may, in some cases, be beneficially renewed, without the further abstraction

of blood, by mere change of posture. If the perfectly erect posture be resumed, syncope will frequently recur, and this state may, in some cases, be advantageously prolonged.

On the other hand, the full effect of an opposite kind of posture, in the various cases of exhaustion, have not, I think, been sufficiently investigated. There are various modes of almost inverting the natural posture of the body, without subjecting the patient to much fatigue. And this principle may be variously enforced in some protracted, as well as sudden, cases of exhaustion.

APPENDIX TO PART SECOND.

CURSORY OBSERVATIONS ON THE USE OF PURGATIVES, OPIUM, BRANDY, ETC.

I HAVE repeatedly observed the assimilation of the effects of irritation and of loss of blood. I would now remark that the effects of exhaustion are frequently seen, and that in their most severe forms, where the loss of but a small quantity of blood has followed upon the undue action of purgative medicine. This fact is exemplified both in regard to adult age and infancy, p. 23, and Appendix ii, p. 135.

In many cases, especially of irritation, I have found it of the utmost advantage to give a cordial purgative, and even to repeat the cordial at the moment of the evacuation of the bowels. The purgative, may in this manner, be prescribed in an efficient dose, its exhausting influence being obviated.

I have repeatedly known the affection of the head so apt to arise from irritation, or at least a similar affection, to be perpetuated by the exhaustion induced by an active purgative, although the first cause were removed by it. This frequently constitutes a very

puzzling state of things. It is obviated by some kind of cordial in medicine or diet.

Of opium I would repeat, that it does harm in cases of exhaustion, when it does more than allay irritability, and especially when it induces stupor.

One of the best modes of exhibiting opium is certainly that of introducing it within the rectum, besides the additional advantage afforded by its admitting of being washed away by injection, if its operation should be too powerful or continued.

The proper operation of opium as a remedy against exhaustion is by allaying reaction; whilst its undue action seems to add to exhaustion, by impairing various functions, but especially that of the act and function of respiration.

This remark is important, because I believe opium to be very frequently, not so much untimely, as unduly, employed, as a remedy for the effects of loss of blood.

Brandy, the sheet anchor against exhaustion, may also be unduly employed. It is so when it quickens, instead of lowering, the pulse, and when it excites sickness and vomiting. In prescribing this remedy, it is therefore highly important to keep within the limits beyond which these effects would be produced.

Next to brandy, as the remedy for exhaustion, must rank various articles of diet. On this subject, however, I have but one remark to add. It is, that

the sickness, which frequently attends exhaustion, is often allayed by giving a little solid food, when other remedies had been tried in vain.

We still want a treatise on the morbid and curative effects of remedies in general.

THE END.